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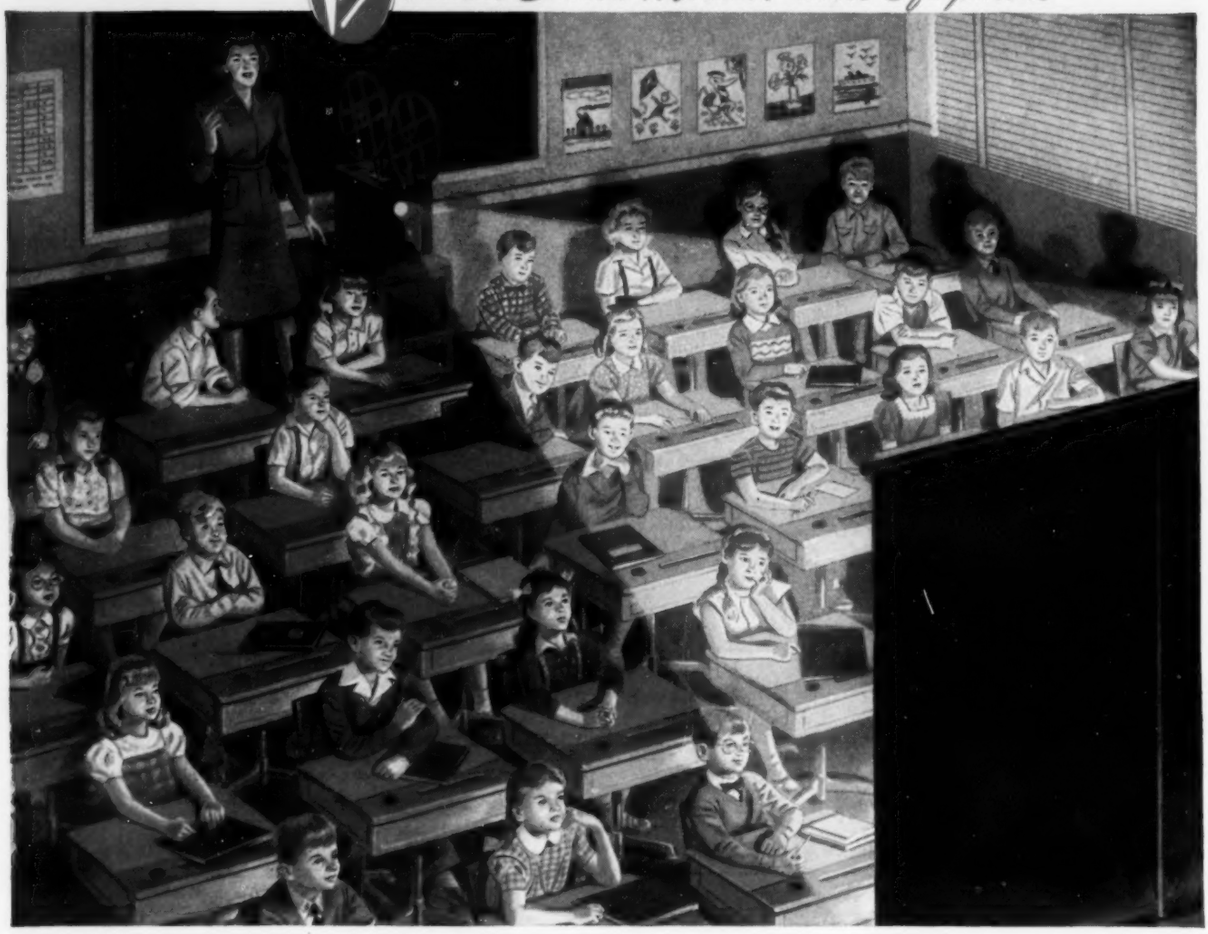

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The contents of this issue are listed in the "Education Index."

Member, Audit Bureau of Circulations and Associated Business Papers.

Pattern for 1947

Much progress and many headaches summarize the developments in school administration during 1946 — a first full peacetime year since V-J day. School operations are closely related to political and economic developments. The great upheavals and changes of the year confronted school administration with many critical problems in all school operation, especially in areas of schoolhousing facilities and maintenance. The extensive program of change and expansion forecast at the beginning of 1946 remains largely in the planning stage although contracts let for school building projects for the year total approximately $220,000,000. Actual construction under way or completed is very little. Survey of schoolhousing requirements, planning and designing of school building projects have greatly increased with continued federal aid. The F.W.A. advanced $3,340,042 for surveys and design of school building projects at an estimated cost of $103,248,416 for the 385 structures included in the project. Under the continually changing conditions effecting material, labor, and costs, bids if and when received exceeded the funds allotted, necessitating refinancing, re-examination, and even redesigning of many of the completed plans. This critical period of deferred action may well prove advantageous by way of more carefully planned schoolhousing facilities and the time needed for more production of required materials, equipment, and supplies.

This brief review of developments in the postwar school building program presents a general outline of the *Pattern for 1947*, for the first quarter at least. Increased production and a degree of price stabilization on construction materials is expected to follow a short period of upward price fluctuations as a result of the removal of price controls. A recession of general business during the first half of 1947 forecast by many authorities may activate school building construction during the coming year.

Our annual *Building Number* again features professional material and especially prepared articles on the school building program. The comprehensive material contained in this issue offers practical information in shaping the pattern of the school building program for 1947.

The "Guide to Products and Services" in this issue serves as a convenient means of obtaining valuable assistance on your procurement problems. Refer to the advertising and then make use of the inquiry form on page 87.

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THE AMERICAN
School Board Journal

Volume 114, No. 1 JANUARY, 1947 Subscription, $3.00 the Year

In Architectural Planning —

What About Tomorrow?

M. M. Steen[1]

It is doubtful whether there ever was a time when designers of school buildings were faced with a greater opportunity and at the same time a heavier responsibility than at the present moment. Due to the inactivity in the school construction field during the war years, a tremendous backlog of needed schoolhousing has developed throughout the country. The volume of this work is estimated by various authorities as aggregating several billions of dollars worth of construction work. To this must be added deficiencies in almost all other kinds of shelter. We are therefore confronted with the problem of a huge national building program and not either enough men or building materials to accomplish it in the near future. The lack of balance in supply and demand and the general unrest and discontent in the ranks of labor have produced an inflated price level and general feeling of uncertainty as to what will happen in the future which has forced private investors and governmental agencies, alike, to hesitate about embarking upon a building construction venture. No one can intelligently forecast what conditions will exist a month, six months, or a year hence, and as a result very few will take the enormous risks involved unless their building problem is one of dire necessity.

Are these present conditions a temporary carry-over of a wartime economy when nations fighting for their lives disregarded cost? In our preparation for war and during that war we developed a genius for organization, invention, and production to a point that astonished not only our enemies but ourselves as well. We performed tasks beyond our own imagination to conceive, and now that peace has come we are constantly told that what we did under the stress of war we must continue to do in the years of peace that lie ahead; but let us stop and consider just what that means. In the first place, when a nation is fighting for its life, time is the most important consideration; cost is secondary. It all sums up to a gigantic international race against time. We must produce larger armies faster and more and better implements for making war faster than the enemy. In prosecuting such a program, no one cares about the cost and the tremendous waste which results. Literally millions of dollars worth of all kinds of machines of destruction were obsolete before they could be gotten into action or shortly thereafter.

We have now won the greatest of all wars both on the battlefields and oceans of the world and in our laboratories and factories. We were really geared up to go at terrific speed, and our national economy developed under the speeding up process to a point where our national income reached a peak of over $160,000,000,000 per year. Disregarding the unusual conditions which produced this state of affairs, we as a people want to keep on at that breakneck speed. We fret at the delays necessary for reconversion. The worker wants wartime pay whether our reconverted economy permits it or not. Yes, we think our present condition is a carry-over of war hysteria and hope and pray that we can regain a proper balance by exercising common sense and good judgment and not be forced ruthlessly into a sane peacetime economy by a general depression.

A Blessing in Disguise

Living under peace, time is also valuable but in a different sense than in times of war. Extravagance and waste cannot be explained away on the grounds of necessity for speed, nor can errors of omission or commission be excused for the same reason. Except in cases of dire necessity, we can keep on using old school buildings until we study how to build better ones and can build them at a price commensurate with our ability to finance them. Far better to delay now than to rush blindly into the hurried designing and constructing of buildings either based on obsolete patterns or new untried ideologies, and live to repent our hasty action for perhaps fifty years or more. No large well-established manufacturer will unload a new product on the public until he has tested it over and over under varying conditions and assured himself in so far as possible that all the bugs have been worked out of the product and that it will fully serve the purpose intended. Those of us who serve the ultimate purpose of producing, through education, the citizens of tomorrow have an even greater responsibility. Our product must be good or all America will degenerate.

We therefore feel that the present enforced delays in building schools are a blessing in disguise. They are the stop, look, and listen signposts which, if observed, will give us the opportunity to survey carefully our problems in terms of today's demands and tomorrow's possibilities. They represent a cooling-off period in which we can catch our breaths after the hard long race of war, and in which we can calmly take up our problems and with renewed strength and purpose more adequately meet our responsibility. This much having been said, let us attempt to analyze our own problems and see what is necessary for a complete and proper solution of these problems.

Organization

In the past it has been a generally accepted fact that the responsibility for building, equipping, operating, and maintaining public schools was vested in individual school boards and their educational and business officers, and that they were in themselves sufficient to meet all the problems involved. Today, forward looking schoolmen realize that although the ultimate responsibility does lie with the school authorities, that responsibility can only be adequately realized through cooperation with other local, state, and fed-

[1]Architect, Chief of the Division of Plant Operation and Maintenance, Pittsburgh Board of Public Education, Pittsburgh, Pa.

eral authorities responsible to the people; city and town planners, architects, and builders; and finally the public itself which pays the bills.

Unless all these agencies participate wholeheartedly, we will end up with inadequate buildings improperly located for the best public interest, and investments difficult to finance either because of unfair distribution of public monies or lagging tax revenues.

The Nature of the Study

What kind of school buildings shall we build?

The answer to this question lies largely in the answer to a second question. What kind of educational philosophy shall we follow?

Even if an answer to the second question were universally accepted and all schools followed the same educational pattern, school buildings would not be designed the same for all parts of a country as large as the United States, or a country in which climatic conditions and topography varied as greatly as they do in our country. While the differences due to climate and topography may be readily appreciated, the differences due to varying educational philosophy are much more difficult to perceive but are none the less real, and it is necessary that the designer fully understands just what pattern the educational procedure is intended to conform to in order that he may translate the educators' requirements into physical building accommodations suitable to the purposes intended.

The fact that in the past school buildings looked very much the same whether located in Florida, California, Maine, or Minnesota seems to indicate that school building design was in general standardized regardless of the fundamental differences encountered. This is an indictment against our ability as designers and one which we should not be guilty of in the future. We feel sure that no one will disagree with the fact that a tropical plant cannot be transplanted in a north temperate zone and be expected to live. Nor should a school design that is suited to a tropical climate be expected to serve with the same satisfaction in a cold climate.

We are told that all schools should be preferably one story structures although it is grudgingly admitted that in some exceptional cases they may be two stories in height. It is suggested that elementary schools should be built on sites with a minimum of 15 acres and that secondary schools should have sites of from 20 to 40 acres. We are further told that the day for constructing huge piles of masonry as schools is past. These are some of the do's and don'ts advocated by some people for the schools of tomorrow. The authors of such suggestions freely admit that they are provocative, so bear with us as we submit our reactions.

The Size of Sites

Concerning the very generous site areas recommended, we would direct attention to what such allowances would mean to a city the size of Pittsburgh where there are 91 elementary schools and 28 secondary schools in operation. Here the present school sites in total area amount to 318 acres and the book value of this land is $7,244,181. From these figures develops the fact that the average cost per acre is $22,780. If we were to provide areas as suggested, we would require a total of 2205 acres or 1887 acres more than we have at present. This acreage at the average cost per acre would amount to $42,986,690. Now compare this cost with the present book value of our present land, buildings, and equipment which is $62,-985,353, and the enormity of the proposal is startling. But that is only a part of the story. The sites as suggested would require vastly larger expenditures for maintenance and operations and these costs would not be one-time expenditures but perpetual expenses.

It is conceded that the good things of life are not gotten cheaply and we agree that we should not be falsely economical and thereby deprive our people of the really necessary things for a satisfactory educational system, but we also know that we will have to defend our position when sponsoring and recommending maximum and minimum requirements and we must judge wisely where necessity ends and extravagance begins. What one person may consider a luxury is often considered a necessity by another, but we represent all the people and our actions and judgments must be based on demonstrable facts and not Utopian dreams.

A small school system located in a prosperous town, borough, or other political subdivision may be able to furnish one or even more of these maximum sites. The land in such cases is far less costly than in a large city, and in all probability only one such site will have to be furnished, whereas in the city it would have to be duplicated many times. Moreover, the small community finds in the one large site a common rallying point for all the community activities; it becomes the town breathing spot or park, the recreational area for all sports, as the building becomes the biggest civic effort.

The Architectural Character of Buildings

With respect to one-story structures, the suggestion as made is too general. The elementary school should be very definitely a neighborhood institution. It should be scaled down to the mental and physical requirements of small children. It is generally located in residential districts and therefore should fit in architecturally with residential architecture. At this level of education the young child for the first time leaves the home environment and finds himself in a new world. That new environment should not be cold and institutional in character; it should retain the feeling of intimacy and be reminiscent of the home in so far as possible. Yes, it might very well be a one-story structure, cheerful and friendly.

By the time the child has reached the secondary level, a decided change has taken place in him and he can readily adapt himself to surroundings of a more institutional type; in fact he might better be subjected to the necessity for such adaptation because a little later, regardless of whether he goes on to the college level or out into the world to make his living, he will inevitably find himself in one of those piles of masonry.

As an educational principle it should be recognized that people should grow in dignity as they grow older, and they should increase their respect for the permanent, durable, long-lasting things that make life more worth while. To grow in dignity one must be exposed to dignified behavior as practiced by older people and also dignified physical surroundings. Why do we construct beautiful, dignified, age-defying structures to house our religions, our governments, our courts of justice, our homes of art and books, in short all the treasures of our civilization? Because only in such places can they be preserved safely and accorded the respect their dignity deserves. Yes, we feel because of what has been said, and because of greater size, and because of safety considerations, secondary schools can be scaled up even to the point where they inspire adolescents, not as purely functional shelters, but dignified structures, bespeaking permanence and beauty.

It should hardly be necessary to say that schools should be built so as to be flexible in their everyday use and so as to be easily altered or enlarged. They should be economically but not cheaply built and while their architecture should express function, it should be pleasing in appearance.

Experience in operating and maintaining school buildings should serve as a guide in determining suitable building materials and methods of construction. It has often been said that you have to live with a person to really know him, and it is just as true that you have to spend a great amount of time in buildings, operating and maintaining them, to know their points of weakness and strength. Unless we are alert and capitalize on this kind of experience, we shall perpetuate our mistakes and waste much time and money in having to do things which incur expense which we could have averted.

We should strive for better natural lighting. Schools are used far more in daytime than they are at night. We should not beg the question and say because schools in the past have been short on good natural light that we will not attempt to improve

that condition but rather ignore it and frankly provide artificial light for daytime use. To do this is to admit defeat as designers and to impose upon the budget an additional expense which will remain with us year after year.

Better Planned Classrooms

Until comparatively recent times the design of school buildings has improved only as necessity in meeting changing conditions of use has forced change upon us. Research work and experimentation in change of shape and method of lighting the classroom is of rather recent date. For many years classrooms have followed the same general design as far as size and shape and window arrangement are concerned. Recently there has been an awakening among designers, not so much because of pressure from dissatisfied inhabitants of school buildings, but because designers themselves have recognized the fact that we were at fault and that in a sphere where we should have been leading we had been ambling complacently. As a result of this awakening, a determined effort has been made to find better shaped and better lighted rooms. The objectives of this search go beyond those mentioned above. They include greater flexibility in the rooms themselves and in the manner in which they combine to make the complete plan. The result of all this is that a variety of shapes are being considered: the square room with bilateral lighting; the pentagonal room bilaterally lighted; rooms planned with attendant work spaces so arranged as to conserve space and at the same time give more flexibility in planning and more informality and less rigidity in exterior design.

The stressing of greater community use of buildings and the greater variety in curricular uses are responsible for other departures from the orthodox patterns. Decentralization resulting in segregated units designed for particular activities make it possible to operate individually any of the plan units thus saving in operational costs.

Introduction of colors in pastel shades replacing the old schoolhouse tan adds variety and cheerfulness and relieves the cold institutional character, thereby making schools more pleasant places in which to live.

A few terse recommendations for modern betterments in tomorrow's schools are as follows:

1. Radiant heating in classroom floors, especially where young children play and work while sitting on the floor
2. Provision for medical and dental clinics
3. Fresh air classrooms provided with special health lamps and sleeping and feeding stations for undernourished or physically handicapped children
4. Special rooms and equipment for children with defective eyesight and hearing
5. Greater attention directed at eliminating safety hazards
6. Improved mechanical installations for visual education and sound programs
7. Provisions for a more abundant recreation program; one which requires larger playrooms and gymnasiums with shower and locker rooms
8. Larger playgrounds with better surfacing
9. Attractive landscaping and gardens where children can learn about flowering plants and vegetables and how to nurture them; not as hothouse plants, but in their natural habitat —

Yes, buildings and grounds designed and equipped in terms of a richer and fuller experience in learning and physical development, and a happier school life.

The architects alone cannot accomplish all the desired objectives because many of the objectives must be the result of educational research. The major physical changes in the schools of tomorrow will be the result of the application of new ideas in learning and teaching methods, new and even more liberal approaches to old subject matter, and a more intelligent development of all that is new.

In order to realize fully our dreams for the future, we, the designers, must not only co-operate with the various agencies who are partners in this enterprise but we must spend some of our time in their places of business so that we may have a better understanding of their viewpoints. We must also spend more time in school buildings and the offices of boards of education observing and learning firsthand the lessons which can only be acquired through the actual experience of living intimately in the environment of and with the people we desire to serve.

Integrating the School With the Master City Plan

Many of our large cities are literally rotting at the core. This is due to a combination of circumstances. First, the development of the automobile and other means of rapid transit made it possible to spread out over vast areas instead of huddling close together in a restricted area where the only possibility of growth was to build vertically. Second, in providing the source of revenue to run public schools we have persisted in using a method of taxation which dates back to the horse-and-buggy days. The economic conditions which prevailed at that time justified that kind of tax, but the economic conditions today are entirely different and to perpetuate the old method of taxation is an injustice to the people and a reflection on our system of governmental organization. Third, our cities have grown in a haphazard manner. Instead of developing according to a rationally planned program, they have been built for the most part by individuals and groups of individuals planning and building as best suited their individual purposes and without regard to how their developments affected the interests of other individuals or the basic economy of the entire community.

Today, people who can afford to move to the suburban residential districts are forsaking the city and its ugliness. In the suburbs which fringe most large cities living conditions may be healthier, cost of living cheaper, and land values lower. Now most of these people still continue to use the city facilities and make their livelihood within the city limits, but they pay their taxes elsewhere. Their children go to schools outside the city and so city schools lose enrollment and shrink. Assessed valuation of property within the city declines and along with it revenue for conducting schools. In the city of Pittsburgh the pupil population (live enrollment) dropped from 108,506 pupils in 1933 to 77,774 in 1945, a loss of 30,732 pupils. The assessed valuation of property in Pittsburgh dropped from $1,211,939,200 in 1933 to $981,426,000 in 1945. With the tax rate set at 11¾ mills by law, this drop in assessed value means a loss in revenue to the school board of $2,708,530. To add to the financial difficulties, cost of living rose during the years above mentioned and required raises in rates of wage and increases in many other operating and maintenance costs.

The city fathers, justly alarmed, have awakened belatedly and are now frantically trying to repair the damage caused by neglect, selfishness, and greed. The city planners here and elsewhere are diligently trying to reconstruct and rebuild the ailing urban districts hoping to turn chaos into order and ugliness into beauty. If this can be done through the willing co-operation of the people, present residents may be induced to stay in the cities and new business may be lured within the city boundaries bringing more potential citizens with it. The inducement must be real and attractive not only to the businessman but also to his workers; otherwise, all the effort spent will have been in vain.

The city planners have at long last developed master plans for the improvement of our cities. Most of these plans contemplate the rehabilitation of neighborhoods by setting up a pattern of improvement districts for the entire city. These improvement districts constitute individual neighborhood communities so designed that fast-moving vehicular travel arteries bypass or skirt the subdivisions, thus assuring

safer and quieter zones, hence happier living. Each district is designed so as to be complete in itself as regards the provision of facilities for communal life. This means that the plan provides for each district to have a shopping center; junior and senior recreational areas located where possible adjacent to a reserved site for an elementary school. It is readily apparent that it will take a long time to actually attain all the objectives envisioned by the plan, but it is not only highly desirable but absolutely vital to the proper development and well-being of the city that all agencies, public and private, plan their improvements so as to be in accord with the master city plan.

To co-operate properly with the department of city planning, the school district should consult with them before determining on the location or program for any school building. School authorities should also notify the planning division of the anticipated abandonment or consolidation of existing schools and the sale of any school properties.

Co-operation With Governmental Agencies

The bulk of the current revenue of most school districts comes from taxes levied on real property within the area of the school district. As has been said, this method of taxation is not only inexcusable under our present economic conditions but if persisted in will eventually undermine and destroy to a large extent the very values from which it seeks to gain sustenance. We recognize the controversial nature of the subject here involved; we also realize that the subject of state and federal aid to school districts is highly controversial. Knowing the complexity of the entire subject, we offer no suggestions here except to say that the subject will never be resolved satisfactorily unless there is genuine co-operation and understanding by and between the taxing bodies and their constituents and between these groups and the lawmaking agencies, both state and federal. Co-operation conducted on a dignified plane of mutual good will and understanding will do far more to find a solution to this pressing problem than a segregated effort in which individual groups herd off in separate camps girding themselves for battle, each one against the other.

Co-operation With the Public

What does the average citizen know about the organization of his school system or its educational philosophy? What does he know about its financial problems and its business administration?

The great majority of the citizens know only what has come to them through the medium of occasional press notices, or from general gossip, or what their own or their neighbor's children have told them. All of these sources of information may be unintentionally misleading at times. Since the public is paying for public education, it should have a very clear and definite understanding of what it is paying for and how much it costs. We feel that the public school officials should accept as a part of their responsibility the work of acquainting the public with their aims and objectives, and further that they should make a careful and understandable accounting to the people on the costs involved. They should take the public into their confidence and invite co-operation in the determination of policies. How can this be done? In numerous ways; by encouraging neighborhood groups to participate in discussion forums; by showing an eagerness to appear at representative gatherings; by letting people know that their suggestions and opinions are welcome; in short by engaging in a progressive, intelligent, straightforward public relations program carefully prepared and conscientiously carried out.

Conclusion

In this discussion we have tried to place before you for your consideration the following major factors:

1. The responsibilities which must be met in planning the schools of tomorrow
2. The organization of agencies which must work together in close co-operation to assure a complete study and a satisfactory solution of the problem, both as regards the determination of the nature of the physical plant and how to get the monies to build, maintain, and operate that plant
3. A general discussion of the nature of the physical plant as dictated by educational philosophy, experience in maintenance and operation, flexibility in present use and later alterations as educational procedures change
4. Co-operation with city and town planners
5. Co-operation with governmental agencies
6. Co-operation with the people of the district as a whole

The organization of interested and related groups must be a real and vital undertaking. It must be a working organization and not merely an honorary group bound together by the slender thread of professional courtesy. Now is the time to lay the foundations for such organizations. We stand upon the threshold of vast undertakings. Intelligent long-range building programs should be developed before we start in upon any one project. The individual projects should fit into the long-range program like parts in a picture puzzle which, when all properly placed, complete the picture. We are living in an age of development which is so fast moving and so startling in its production of new things that much will be expected of us as the designers of the school buildings of tomorrow. In closing, I wish to repeat for sake of emphasis that we have a golden opportunity, but we also have a tremendous responsibility. Let us make haste slowly and not be found wanting when the final analysis of our efforts is made.

Planned for Growth

Herbert F. Everett, A.I.A.[1]

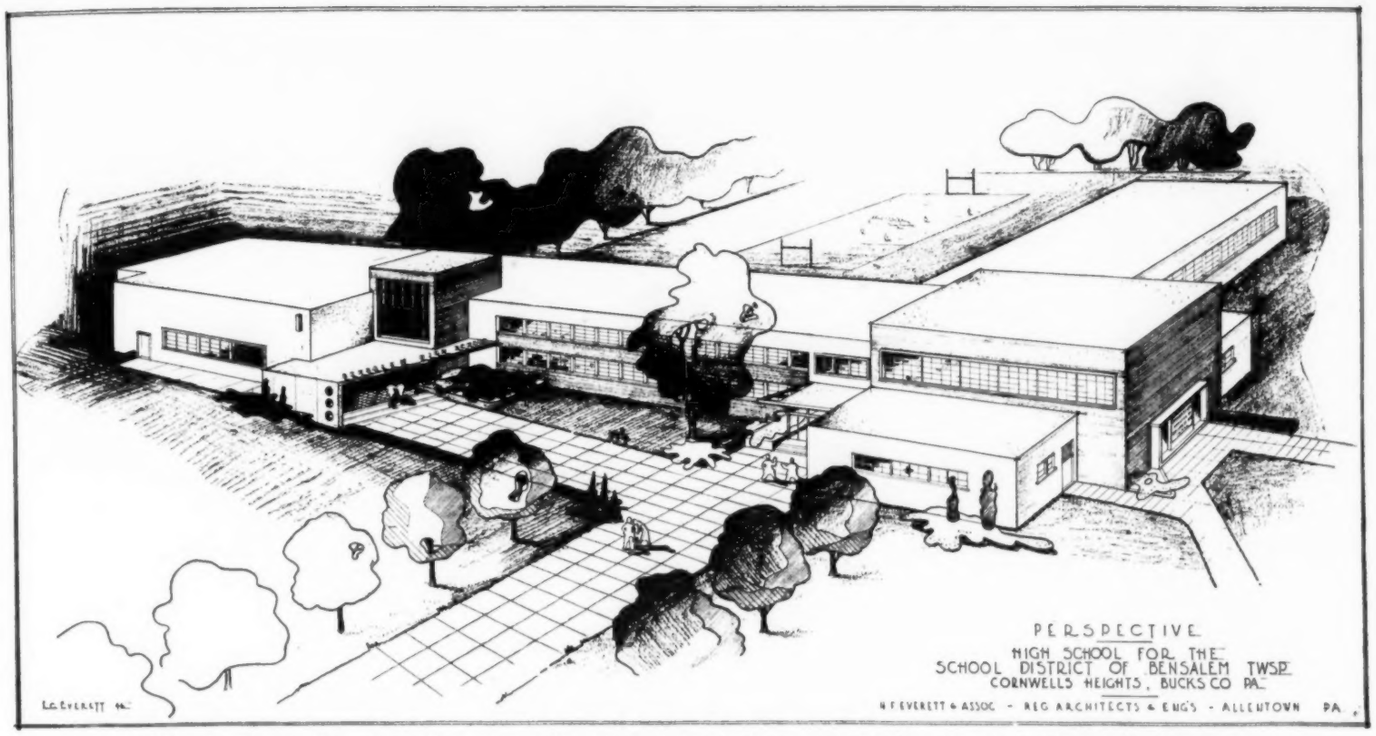
The Bensalem Township High School, Bensalem Township, Bucks County, Pa., is a prosperous community in one of the finest farming areas of the United States. Its proximity to Philadelphia gives cause for the prediction that it will soon become an outlying suburb of the city. In studying the school plant problem of the community this fact was seriously kept in mind as was also the further fact that the local educational program is constantly developing in scope and that any building erected will require facilities for adult education and for community center activities.

The main entrance of the building has been placed to give immediate access to the auditorium, the library, the administrative offices, and the home-economics department. Attention has been given to the certain necessity, at some future date, of a "little theater" which will serve also as a room for instrumental and vocal music and for visual education. It is planned that the room will adjoin the main auditorium stage, and that it provide in special storage areas space for stage equipment, instruments storage and a music library, and a series of practice booths.

The gymnasium, with its lockers and baths, the school shops, and the kitchen are placed at the extreme right end of the building. The arrangement has taken into account the ready accessibility of these areas, both for the pupils and for community users and adult students. Noise and other objectionable products of the shops and of the gymnasiums have been kept away from the classroom space. It is expected that the setup will encourage the use of the building at night for educational and entertainment purposes, and for independent athletic and shop activities.

The gymnasium is designed to provide two complete physical education floors so that the

[1]Senior Member of the firm of H. F. Everett and Associates, Allentown, Pa.


PERSPECTIVE
HIGH SCHOOL FOR THE
SCHOOL DISTRICT OF BENSALEM TWSP.
CORNWELLS HEIGHTS, BUCKS CO PA.
H F EVERETT & ASSOC - REG ARCHITECTS & ENG'S - ALLENTOWN PA

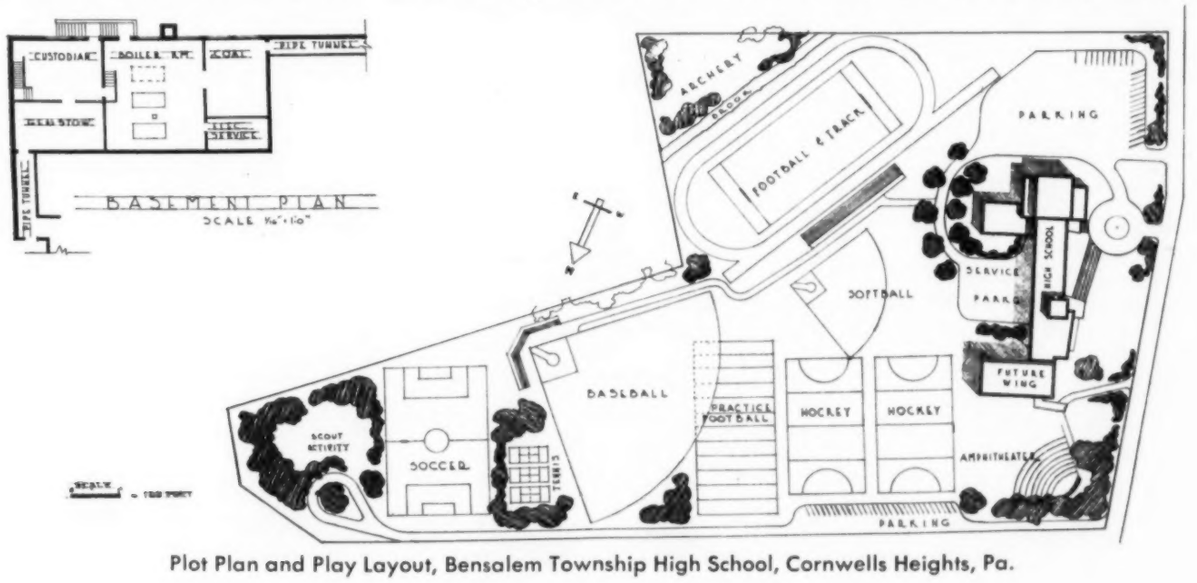
Architect's Perspective, Bensalem Township High School, Cornwells Heights, Pa. H. F. Everett & Associates, Architects and Engineers, Allentown, Pa.

boys' and girls' groups may use the room independently of one another. An electrically operated folding wall and rollback bleachers are provided so that the room will be available as one large area for athletic games, pageants, and other entertainments. The bleachers will seat approximately 1000 persons.

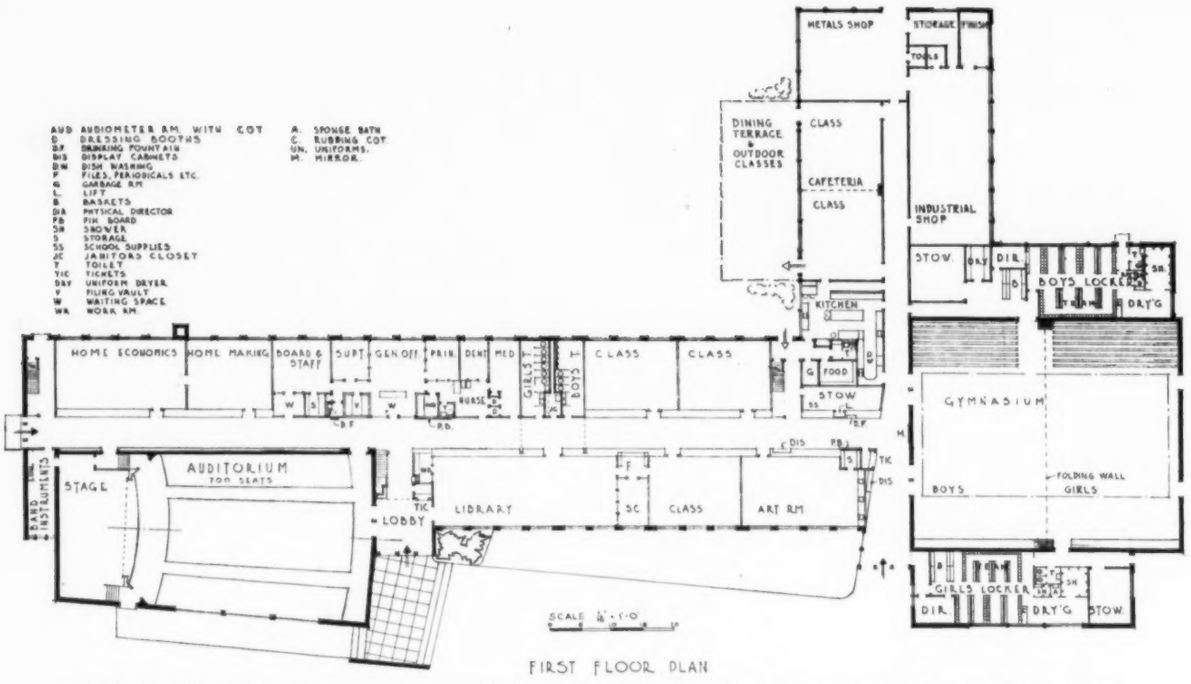
The regular boys' and girls' locker rooms and showers will be used for the athletic teams when interschool games are played. It is planned ultimately to have a field house for the outdoor sports. With the present double use of the lockers in mind, one half of the locker room has been fitted with alternating lockers and benches sufficient for a class of 40 pupils. Each pupil will have an individual basket for his wardrobe, to be stored in racks, located in a well-ventilated room in front of the locker room proper. The other half of each locker room is arranged with lockers around the walls and benches grouped in the center for convenient use and for conferences with the coaches.

All lockers are 36 inches high and are set on 6-in. sanitary, coved tile bases. The locker tops are sloped 45 degrees to prevent the depositing of paraphernalia and rubbish. These low lockers give a complete view of the room, are advantageous for control by the teacher, and provide strong incentives for cleanliness and orderliness.

The cafeteria has been so located that additions may be made to allow for expansion in width or for extending the room into the present shop area. The kitchen too can be expanded, and the shop may be replaced by an addition in the rear. Folding doors separate the kitchen and the serving counter from the



Plot Plan and Play Layout, Bensalem Township High School, Cornwells Heights, Pa.



First Floor Plan, Bensalem Township High School, Cornwells Heights, Pa. H. F. Everett & Associates, Architects and Engineers, Allentown, Pa.

cafeteria so that the latter may be used as a study hall or subdivided into two standard classrooms.

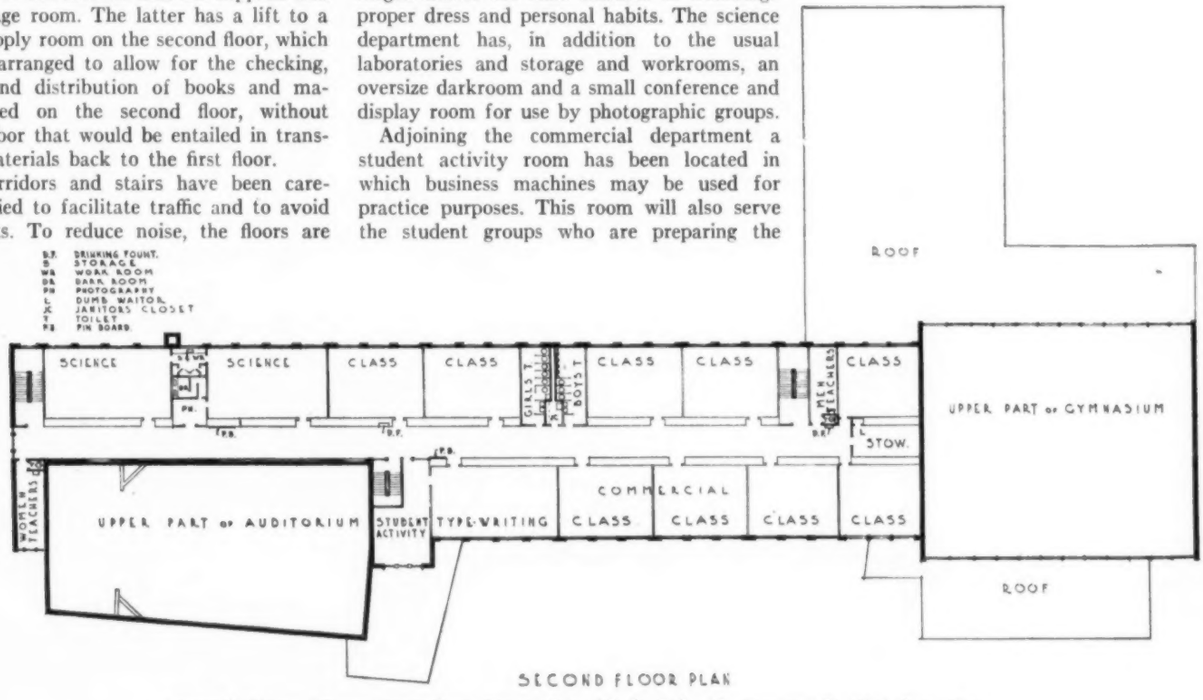
To encourage outdoor activities, the terrace adjoining the cafeteria has been arranged to permit of use in fair weather for outdoor dining and for class use.

A well located entrance door of suitable width serves the kitchen and the supplies and book-storage room. The latter has a lift to a special supply room on the second floor, which has been arranged to allow for the checking, storage, and distribution of books and materials used on the second floor, without further labor that would be entailed in transferring materials back to the first floor.

The corridors and stairs have been carefully studied to facilitate traffic and to avoid bottlenecks. To reduce noise, the floors are to be built of asphalt tile, and the ceilings are to be covered with acoustic tile. At strategic points in the corridors, display cases will be placed to show students' work and accomplishments. Tackboards are planned for the display of worth-while art products, pictures of current events, world doings, and school notices. A novel feature will be a full-length mirror for each corridor to encourage proper dress and personal habits. The science department has, in addition to the usual laboratories and storage and workrooms, an oversize darkroom and a small conference and display room for use by photographic groups.

Adjoining the commercial department a student activity room has been located in which business machines may be used for practice purposes. This room will also serve the student groups who are preparing the school periodicals, bulletins, and other duplicated materials necessary for instructional purposes.

A comprehensive plot plan has been prepared by the architects so that the school grounds may be properly beautified and fully developed as a community showplace and outdoor athletic center.



Second Floor Plan, Bensalem Township High School, Cornwells Heights, Pa.

The 1947 Problems in —

Financing Your New School Buildings

Herbert B. Mulford

School boards and administrators, in entering the new year, face sharp increases in costs, both for capital outlay for new buildings and in general operating expenses. These increases put a premium on the wisdom of school officials in making decisions regarding their building needs to determine whether building should be begun at once or should wait, in the hope that conditions will be adjusted more to the benefit of the schools later on. The principal factors in the whole situation include the following:

Situations Affecting School Finance

1. Continued shortage of building materials and labor, which increases the large backlog of needs for new construction, and for additions and replacements in public buildings.

2. Increase of about 100 per cent in building costs since before the war, with continued threats of more increases as labor troubles involve total production of the country.

3. Great increase in the supply of municipal, including school, bonds. Compilations by the *Bond Buyer* show that on last election day votes were cast in numerous communities on propositions to issue a total of $1,105,713,444 of bonds. Of these at the time of the compilations $941,486,000 were approved, $33,051,000 were rejected, and the remainder were in doubt.

4. Steady upward creep of interest on municipal bonds. The same authority indicates a rise of interest rates for the best grade bonds from 1.04 per cent to 1.39 per cent. Since these compilations were made, there has been a further decline in demand. This average is too favorable to be construed as operative with thousands of smaller and less well-known school district credits. Whereas a year ago there were almost no legitimate cases of wise financing that ran above 2 per cent interest charges per year, now there are plenty of cases where school boards in the last months of the year agreed to pay more than that rate on their paper.

5. Continued heavy shortage of teachers, thousands of closed classrooms and smaller schools, and small enrollments in teacher-training institutions to make up the deficit. This in turn has produced complications in increased teachers' salaries. Not only have there been attempts to meet costs of inflation through bonuses and in some cases sliding scales to compensate for living costs, but flat increases have been frequent. On the other hand, correspondence from different parts of the country shows serious lags in the less well-informed communities in meeting the emergency. Numerous tests of the temper of teachers, including strikes, indicate that they think that the real problem of increasing teachers salaries, long notoriously low, has not been met by most of the increases of the past few years. Thus there may be new financial demands on school boards unless the spiral of inflation is stopped.

6. The influence of a Republican Congress, with its avowed intention of cutting federal income taxes by about 20 per cent, has already been felt to some extent, if not discounted, in the rise in federal tax-exempt municipal bond interest rates. The financial markets have a way of trying to anticipate — something which school boards seldom understand. The most significant effect which may or may not later develop from any national pattern of tax reduction could be a determined stand by the rank and file of smaller local taxpayers against increasing costs of local public boards. One cannot forecast here whether public relations between individual school boards and the citizen owners of the local schools will become an additional problem in 1947.

7. The unpredictable outcome of changing business conditions as they are affected by reconversion from war production. After World War I, excessive prices of a mildly inflationary character were brought down by deflationary movements. But at that time we had only just begun to be a world creditor nation, we had not incurred a gigantic national debt which remains chiefly in the hands of banks and fiduciary concerns to extend inflation, we had not had a long period of artificially depressed interest rates, heavy "lend-lease" operations and government international financing, and we had not embarked so widely upon heavy plans for social security which involve seemingly permanent additions to a heavy tax structure.

Where Information Is Needed

Unfortunately there is little public service to solve the broad problem involved in the combination of these influences. In general, the superintendents in the more lucrative positions have been better trained to an awareness of these problems than have those in the more poorly compensated districts. Similarly, often the school board members in the affluent district are more alert to the problem than are those of the poorer and more sparsely settled districts. Thus it often happens that the districts where financial problems are most serious in their affect on children have the least information. This makes it all the more important that there be a wide spread of knowledge of the more significant ways and means for financing new school buildings, once the school board and the community have decided that necessity demands new construction.

In a slowly rising market for money, just as in a similar market for labor and building material, there is always grave likelihood that the complexities of the case may serve as a cloak to cover excessive costs. Shrewd bond dealers can the more easily urge immediate financing lest interest charges mount higher. They can also urge private sales by representing that the open market is not favorable. They can manipulate technical features of maturities of bonds, legal opinions, premiums, and interest rates in such fashion as to appear to be doing a great service instead possibly of a disservice. School lawyers may be given authority to such a degree that legal fees can mount to figures out of all reason. All this because both superintendents and board members may not have made a thorough study of all factors which enter into binding the school district with debt for the next ten to thirty years.

From numerous cases disclosed by professional surveys of school systems and the broad experiences of conservative banking houses specializing in municipal bonds, serious blunders in financing buildings warrant the typing of financial procedures in two classes: (1) *What to avoid;* and (2) *What to do.* These can be laid down practically as axioms for guidance of school boards and administrators, as follows:

Dangers to Avoid

Normally avoid single long-time maturity of new bonds, lest there be complications in respect to sinking funds, interest charges over a longer period than necessary, and inability to refinance on more advantageous terms.

Do not make presale tentative contracts with one bond house, thus excluding competition in the buying of the bonds.

Do not give authority to school lawyers to sell your bonds. While you may get some aid from attorneys in suggesting bond dealers who could handle your financing, it is not the province of lawyers to market bonds. Hence you should be suspicious of any suggestion to this end.

Do not permit, under present market conditions early in 1947, the profit to bond dealers of more than 1 per cent of face value of your bonds without making a very careful check on the market. The margin of profit in school securities at this time is very small. You should benefit by it.

The normal charge for attorneys' legal opinions and guidance on preparing school board proceedings for the issuance and sale of bonds, *from beginning to end,* is about one dollar per thousand dollars of the face value of the bonds. There are plenty of cases in the files of banking houses and school attorneys, not to mention suffering school boards, where the attorneys fees have been extravagant.

Things That Should Be Done

On the other hand there are several positive actions the school board and administrator should take on behalf of their district, such as the following:

Financing the new buildings is just as important as planning their construction. Therefore, long before building contracts are entered into, the school officials should seek the best information in respect to all details on borrowing. This should be made a painstaking study. Unfortunately, although numerous public conferences of administrators, school boards and even teachers and the patrons of the schools go into great details on building plans, scientific financing is almost never discussed at such gatherings.

Under most circumstances, the bonded debt should be planned to mature serially from, let us say, one year after issuance to the maximum legal time limit provided under state laws. At the same time, the planning of the bond maturities should be such that they will fit in well with any previously outstanding debt and the assured income of the school system, with plenty of bonding power left over to provide for possible emergencies when additional borrowing may be needed. Distribute the tax load for debt services as evenly as possible on your taxpayers.

Ascertain where the chief markets are located that would presumably absorb your bonds. Then make intelligent inquiries of bond dealers in that locality, with the possible assistance of local bankers, concerning rates of interest currently received on bonds of school districts comparable in credit to your own.

With such information, send out invitations to a considerable number of reputable bond dealers to submit sealed bids on your issue of bonds, which you should describe in full detail. Always provide in your prospectus for the option to reject all bids; also require certified check for a reasonable percentage of the transaction, so that the bond dealer may not default on his bid without penalty. Also require that the dealer shall pay any interest accruing on the bonds between the time of sale and any possible delayed date in delivery of the bonds to him.

Endeavor to have the interest rate borne by your bonds as close as possible to the current value of borrowed money. Where the bonds bear a higher rate than the going price for money, be sure that you understand what receiving a cash premium on your bonds means in terms of interest. If the interest rate is too high, it means extravagant profit to the bond dealer. If the premium paid to equalize the interest charges in conformity with real money value, is too small, the bond dealer still makes an extravagant profit. The best test of the value of money is the actual offers made in sealed bids at competitive selling of the bonds.

Legal Minutiae Must be Observed

These details, especially in respect to the exact dates of maturities and the interest coupons maturing over the life of the bonds, require minute attention by attorneys, the printers who print the bonds, the bond dealer who buys them, and the several school officials who authenticate them. There are numerous cases where such details involve vexatious, and sometimes costly, errors.

The duties of school officials do not end when the proceeds are received for the bonds. Throughout the entire life of the bonds there should be close attention to the details of the machinery of tax levies to meet debt service, payment of maturing principal and interest, and the cancellation of securities which have been retired. Blunders occur constantly in all such proceedings.

Under current low money market conditions, there has not been the great need of other years to provide in the bonds an optional clause authorizing the school board to call in the bonds for prepayment before the nominal maturity date. During the long period from the high interest market during the early 1930's, when many bonds were sold at as high as 6 per cent interest or more, down to the present lower rates, there has been abundant opportunity for school districts to refinance at a great saving in interest charges. Unfortunately for most districts, the bonds had no call option; thus the districts continue to pay three to five times as much interest year after year as would have been the case had the option been provided originally. As interest rates tend to creep upward, this callable feature merits careful consideration by school officials.

It would be almost unnecessary to admonish school officials to obtain building money when it is obtainable. That is, it usually is wiser to sell as many bonds as will cover the entire building project costs at one time, instead of trying to save a small amount of interest that might accrue on the bonds during building operations. This latter thought often leads to doing piecemeal financing, with the result that sometimes the school board is caught without enough money. In low money markets this is not so grave a temptation nor as dangerous a proceeding. Sometimes boards with the same thought in mind conduct for their financing by giving contractors their bonds. Two dangers exist here: Adverse conditions may badly affect the contractor, even bankrupting him. Usually, having such difficulties in mind, the contractor may make a bargain with the school officials which makes costs of financing greatly higher than would result from forthright clean financing by selling bonds to the highest bidder.

Problems of Reorganized Districts

A special situation exists with some of the recently reorganized school districts in those states where redistricting is going forward under pressure for improvement of educational opportunities. For the most part the redistricting is for the purpose of expanding the basis of financial support of local schools, at least to the point where a thoroughly competent professional administrator may be employed. Usually such mergers center around some well-established community, but not always. Where a number of farmers, women, or small businessmen not experienced in government financing are retained on the school board, or where the superintendent happens to be chosen from faculty members without experience in financial practices, trouble may, and often does, arise in borrowing. Numerous cases among newly organized school districts indicate that school officials seem not to have understood that school bonds are exempt from heavy federal income taxes, and therefore can be sold much more advantageously to the district in respect to low interest rates than can mortgages on farms or houses or loans to small businesses. This situation prompts the admonition that professional educators everywhere, whether on national, state, county, or local levels, should spread information that will be helpful in saving expenses of borrowing money to finance greatly needed new school buildings.

Notwithstanding the assistance accorded school officials by competent attorneys and bond dealers, technical blunders crop up frequently even after bonds have been issued and sold. If these are serious, they may be the cause for tax objections from property owners or serve to discredit the district's securities. In order to provide a series of checks on numerous official acts of school board members or administrators, the present writer some time ago prepared the following technical check list for Northwestern University, where it is now being used in classes of school administration:

SOME PRACTICAL QUESTIONS IN SCHOOL FINANCE

Has the school board discussed its prospective financial operations with several different bankers and bond dealers?

Has the board refused to make tentative private contracts for the sale of its securities before it has thoroughly studied the matter?

Has the board obtained circulars from bond dealers offering similar school securities for sale, in order to understand market conditions?

Does the board know the principal large markets for school securities?

Does the board know that the current profit for dealers handling school bonds is 1 per cent of face value or less?

Has the board decided to issue serial maturity bonds instead of one long-term maturity, and thus save about half the costs of borrowing?

Have the serial maturities of the issue been carefully adjusted to bonding power, taxing power, actual tax income, and any previously existing debt, so as to make an even load on the taxpayers?

Has due regard been given to preserving a margin of borrowing power against any other future needs for borrowing?

Has the board required an optional privilege in the bonds so that, if desired, the bonds may be called in for payment before the determined maturity date, and thus stop interest charges or enable advantageous refinancing?

Has the board declined to finance except on the basis of competitive bids?

Do invitations to bond dealers to bid include the privilege of rejecting all bids and the requirement of certified checks to be deposited as guaranty of good faith of the bidders?

QUESTIONS ON COST OF BORROWED MONEY

Does the board know precisely at how low an interest rate it can borrow money?

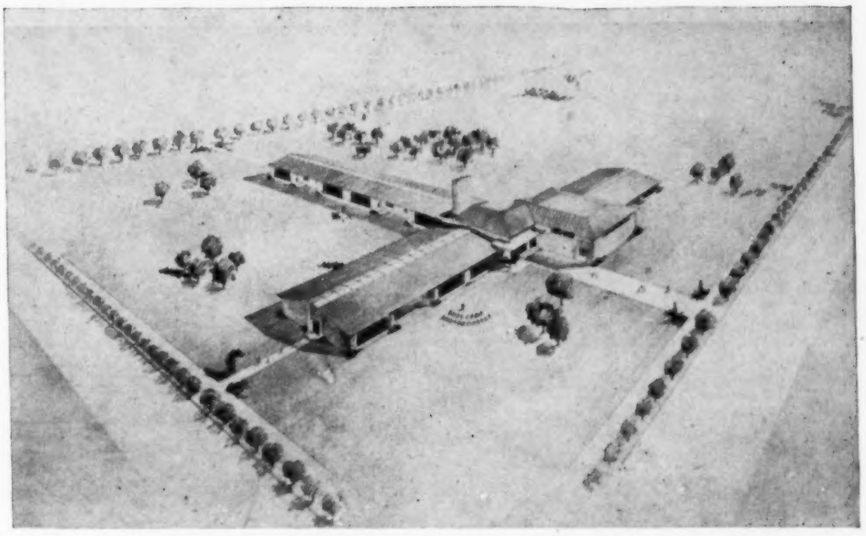
(Concluded on page 82)

A Superintendent Reports —

Perrysburg Plans for Its Schools

E. D. Jarvis[1]

The Perrysburg School District, located within a few miles of Toledo, Ohio, is one of four similar sized suburban residential communities. Legally, it is a consolidated school district comprising 29 square miles of territory, with about 5000 population and 1000 school children. About 30 per cent of the pupils reside outside the city limits. The town itself is characterized by wide streets and a general atmosphere of spaciousness. The existing school buildings are located in the geographic center of the town; 600 children are enrolled in one elementary building and 400 in the 4-year high school.



Airman's Perspective, Perrysburg Elementary School, Perrysburg, Ohio. — Britsch & Munger, Architects, Toledo, Ohio.

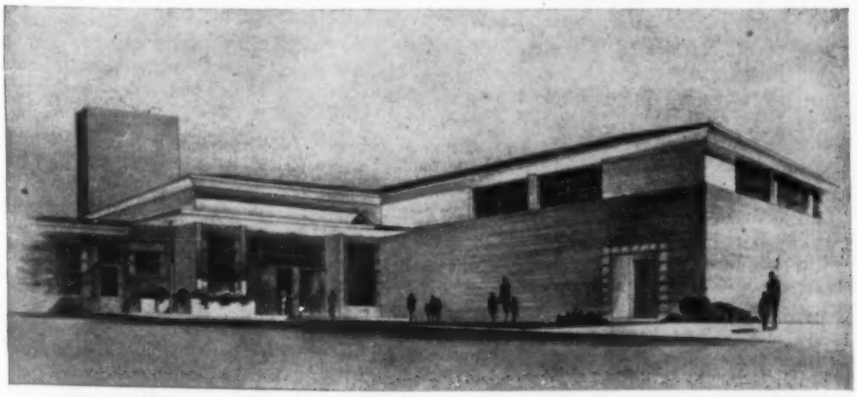
The Preliminary Planning

As early as 1942, it was pointed out to the Perrysburg board of education and the voters that they should look forward to the time when the organization of the schools should be changed from the 8-4 plan to a 6-6 plan. Between 1942 and 1944 tabulations of enrollment and studies of repair needs showed the inadequacy of the present buildings particularly of the extremely old elementary building. Both the board of education and the citizens generally were made aware of the situation in the annual reports of the schools.

Early in 1944 a statement of general building requirements was presented by the superintendent. This statement included complete details of three alternative plans under which the problems might be solved. The type of elementary building desired, together with descriptions of the typical classrooms and other special rooms required, was outlined. During the summer of 1944, a completely revised set of considerations was agreed upon. To crystallize local thinking, authoritative outside advice was considered necessary, and the Bureau of Educational Research at Ohio State University was requested to make a survey. The superintendent collected complete data concerning the district, its finances, enrollment, population, etc., and this material in the form of 14 tables was presented to the Survey Committee in the Bureau of Educational Research. On July 22, Dr. T. C. Holy and Dr. Wm. Flesher, after a study of local conditions, presented their recommendations and these were accepted by the board of education.

The next step was, of course, preparation for the bond issue itself. About this time the firm of Britsch and Munger, architects, was employed to prepare preliminary sketches which could be studied by the board and presented to the public. A member of the firm is a local resident. The firm, which had designed the present high school building, has been responsible for a large number of schools in northwestern Ohio and southeastern Michigan. We were, therefore, fortunate in having the personal interest of such a capable architectural group.

[1]Superintendent of Schools, Perrysburg, Ohio.



Detail of Entrances, Perrysburg Elementary School, Perrysburg, Ohio. — Britsch & Munger, Architects, Toledo, Ohio.

The Public Relations

The first public presentation of the proposed bond issue was made September 1, 1944, just two months before election day. It was decided that all efforts be confined to the presentation of facts, and that the importance of the new buildings to every citizen be made clear. Seven specific means for presenting the facts were used.

1. Each of the two weekly local newspapers carried ten articles familiarizing the readers gradually with all of the phases of the plan. These articles began on September 7 and continued weekly to election day. The titles of these articles were:

a) Board of Education to Present Voters With $387,000 Bond Issue. (An overview with general details of the plan.)

b) What the School Bond Issue Will Provide the Patrons. (A complete enumeration of the facilities to be provided.)

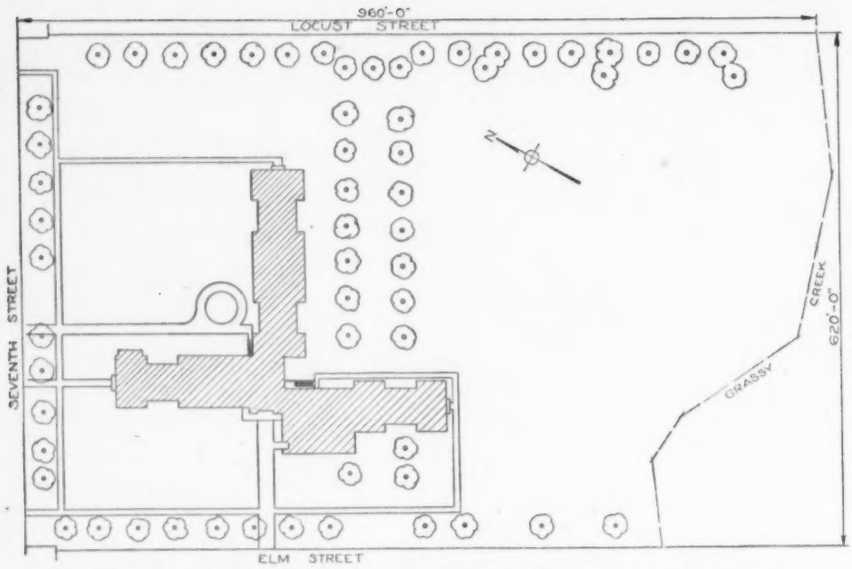
c) Why Is the School Bond Issue Being Offered Now?

d) Some Facts and Figures Concerning the School Bond Issue. (A presentation of costs, savings by reduced interest rate, comparison of tax rates, etc.)

e) Where Should an Elementary Building Be Built? (Eleven reasons for moving the elementary school from the old site in the center of a traffic problem to a newer, safer, more spacious place.)

f) When Should a Building Be Replaced? (Why the buildings were inadequate and unsatisfactory.)

g) Why a One-Story Building? (Arguments for a one-story plan, for adequate natural light-



The plot plan of the Perrysburg Elementary School showing the location of school building and of the play areas.

ing, and for the type of elementary classroom proposed.)

h) To Whom Shall the Elementary Buildings Be Dedicated? (A plea to provide the new buildings as memorials for the local men and women in the armed forces.)

i) What the Proposed High School Addition Would Do. (This emphasized the added educational advantages to be made available.)

j) Has the Architectural Design Been Determined for the Proposed Elementary School? (A discussion of the fact that the final architectural design could be determined only when the plans were well advanced and the bond issue had been voted.)

2. During October, the superintendent presented an illustrated discussion of the bond issue to 13 organized groups. The addresses reached a large portion of the community's leaders and, since the facts were backed by proof, practically no questions of any kind arose. The architect also discussed the project in several groups.

3. About three weeks before election day a 12-page "Prospectus" was sent to every home in the school district. This booklet carried illustrations of the proposed structures, 23 pictures of undesirable features of existing buildings, and 8 tables and graphs of financial comparisons, trends, etc. The text covered all phases of the proposal. We credit this prospectus with having actually convinced more people than any other one effort.

4. Of course, from September 1 to November 7 the teachers made use of arithmetic problems pertaining to finances presented in the bond issue; in the civics and sociology classes they discussed the duties of a community for planning future educational needs, etc.

5. Six days prior to election day all pupils took home mimeographed dodgers urging the parents to vote. Only 47 per cent of the homes in the school district have children in the public schools, and it was felt that every one of these homes would have to vote right, otherwise the required majority could not be reached.

6. The Parent-Teacher Association provided about one hundred block workers, to call on all voters in their areas urging them to cast their ballots. This visiting was done on the afternoon and evening prior to election Tuesday. The intent was not so much to urge people to vote *for* the issue as it was to get out the vote. We knew that a large vote meant improved chances for the issue.

7. Throughout the election day, according to prior announcement, the large bell in the old elementary building was rung hourly for two minutes. This was for the purpose of reminding all within hearing distance that this was a day for discharging an important duty and privilege.

The publicity squad of the Victory Corps was a great help in disseminating information.

Total Community Values Planned

Looking toward the future the plan proposed will make it possible to bring our high school athletic field and one school plant together and later incorporate a bus garage and dressing room facilities together. The newly purchased site is adjacent to a village owned park area as yet not developed, and it is our hope that all recreational facilities may be centered here, thus avoiding unnecessary duplications.

Philosophy Behind Planning

Closing each of the speeches during the bond campaign the superintendent presented eight questions designed to stimulate individual thinking:

1. Shall the schools lag behind public necessity and demand, or shall they lead the way?
2. Shall community growth and development be followed by later providing necessary facilities, or shall good facilities be provided in order to precede and help growth and development?
3. Shall we attract suburban development, or shall we wait while other near-by communities surpass us?
4. Shall the community plan for wholesome surroundings for young people, thereby neutralizing and minimizing any tendency toward juvenile delinquency?
5. Shall this community planning be centered on improved school facilities and outdoor recreational provisions such as playgrounds, a park, and swimming pool, or shall community planning wait for makeshift, temporary, piecemeal, unsatisfactory schemes carelessly prepared and hurriedly carried out to meet an unsavory situation after it has arisen?
6. Do we wish to have the best suburban community in the Toledo area, or are we content to live in the "cheapest" place? (Cheapest — meaning lowest tax rate.)
7. Shall we prepare for the best suburban community in future years, thus insuring its actual existence, or shall we take the easiest but most disastrous way of opportunism?
8. Shall we be prepared for an actual increase in population and the expansion of the school's responsibility? Shall we anticipate enlargement of the district?

Basement Plan of the Perrysburg Elementary School building.

On November 7, 1944, the bond issue of $387,000 was passed with a vote of 75 per cent in favor of the project.

The Planning Continued

Prior to the passing of the bond issue three applications were presented to the Federal Works Agency seeking financial assistance in preparation of plans. One application, for the high school addition proposed, was approved. The other two plans to date have not been acted upon. Since the district was aware of the fact that the bond issue as offered could not cover the entire cost of construction planned, it was hoped that federal assistance would become available in the future. FWA assistance in the planning, it was felt, would place the district in a position for early approval when grants in aid for construction were made available.

As soon as the vote was approved the bonds were sold at 1½ per cent, plus a large premium, and the proceeds were invested in ⅞ per cent U. S. Treasury Certificates.

At this point the teachers and other school employees were asked to consider the skeleton plans already provided, and to make comments and positive suggestions for improvement. In connection with this critical study, which went on until March 1, 1945, a well-

known school-building questionnaire was used in an attempt to get a general agreement on material, specifications, and such items as furnishings and equipment. The same questionnaire was used with the board members and interested parents. The replies to the questionnaires were compiled and compared with summarized opinions of a large number of architects and superintendents.

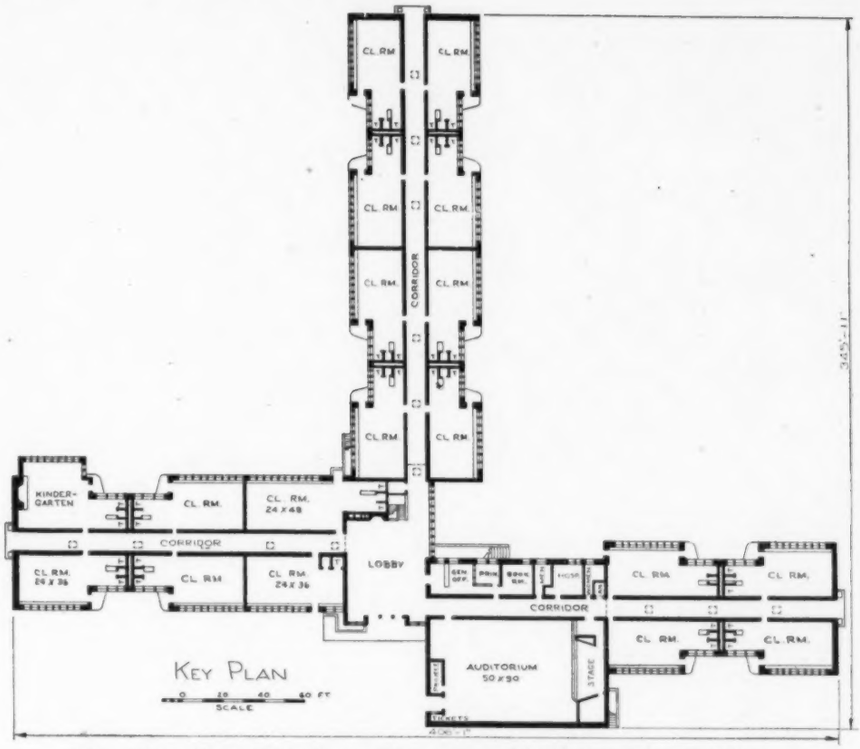
In March, 1945, the Owens Illinois Glass Company, Toledo, set up in the physics laboratory of the University of Michigan an experimental classroom similar to that planned for the elementary building in our city. The purpose was to provide the glass company and ourselves with data on lighting conditions which might be produced with different kinds of glass materials placed in outside school windows and clerestory windows. By August 28, 1945, a general agreement had been reached upon most of the fundamental principles to be embodied in typical elementary classrooms. Between October, 1944, and September, 1946, a total of six revisions of plans were made before we finally adopted the detailed plans and specifications for both buildings.

Thus in September, 1946, after about two and one-half years of planning, our projects had been practically completed.

The High School Addition

The addition to be attached to the present high school building will conform to the original building in design and largely in construction and finish. The present gymnasium seating capacity will be doubled and two cross courts will be provided and the present length of the floor used as a new playing court. Twice as much dressing room space will be provided and a team room and storeroom space will be added. A social room semicircular in shape, with auxiliary automatic heating equipment, a stage, and provisions for serving refreshments will be an innovation. This room will double as a classroom for dramatic groups, music groups, and evening meetings up to a capacity of 100 persons. The music room immediately above will be the same in shape and will have two small practice rooms adjacent. A new large shop, square in shape, will be equipped for "general shop" courses, including planning, metallurgy, woodworking, electrical working, sheet metal, and automotive mechanics. The new library and study hall is to be a large square space. Off of this room will open a conference room and a book repair room.

A number of alterations will be carried out in the present high school building. The home-economics department will be equipped with a fitting room, new unit kitchens, laundry equipment, refrigeration, and other facilities. A new cafeteria will consist of three dining rooms separated by sliding partitions. Vocational agriculture will be placed in the old shop space. Art rooms are to be renovated and new equipment provided. A book storage room, extra storage space for stage scenery, oil heating, and an elevator for supplies are extra features to be added.



First Floor Plan, Perrysburg Elementary School, Perrysburg, Ohio. — Britsch & Munger, Architects, Toledo, Ohio.

The New Elementary School

A site comprising 14 acres of completely level space has been bought in the future geographical center of the town for the new elementary school. This site is removed completely from through-traffic hazards, is free from noise and dirt, and is in a beautiful landscape setting.

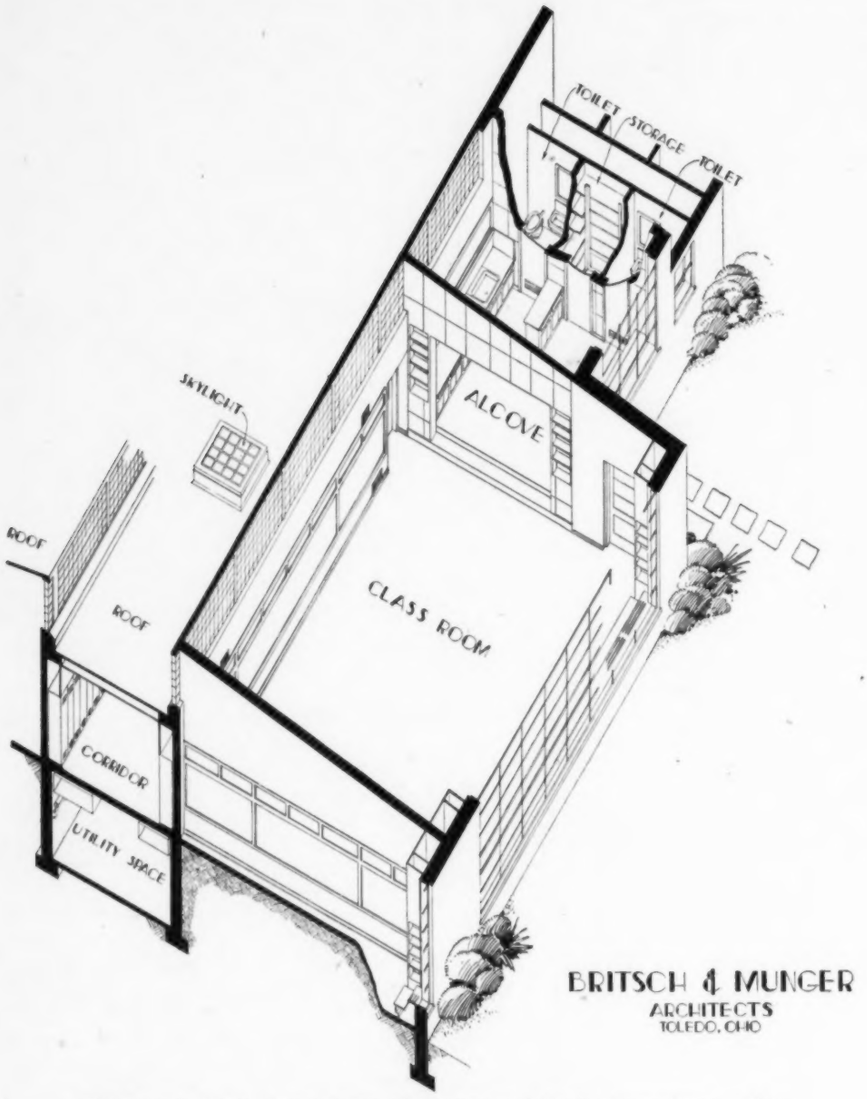
The building planned will accommodate more than 500 children, but will be so built that the wings may be extended without costly alterations. The general plan is T shaped, at the center of which are the community and administrative facilities. The auditorium will be equipped with seats for all sizes of children as well as adults, but is being planned primarily for children. The stage will have steps across the front and the floor will be inclined somewhat. Cinder block walls will be used and the ceiling will be shaped and treated to provide excellent acoustics. Offices and a clinic will be provided near by. This central lobby will be well lighted and fitted for social gatherings with a fireplace and comfortable chairs. Immediately under the lobby will be the cafeteria, playroom, and bicycle storage room. The three corridors leading to this common lobby are to be lighted by recessed fixtures and skylights. It is planned to place kindergarten, first and second grades in one wing, third and fourth grades in another wing, and grades five and six in the third wing. Near to the center of the building is to be placed a classroom provided with equipment necessary to accommodate an ungraded class.

The typical classroom of this building will provide more space than usually has been provided for elementary children. The room itself is to be approximately 24 feet by 36 feet with an alcove workroom 15 feet by 20 feet. The size will be justified, however, by a study of the activities held desirable for children of this age. It is the belief of the local school authorities that each elementary classroom should be, as nearly as possible, a complete living unit which the children need not leave under normal circumstances.

Special efforts have been given to the problem of lighting. The outside wall will be entirely glass and to prevent heat losses, it is hoped that special glazed windows will be used. Opposite this wall, high above the blackboards will be an area of glass block planned to reflect the light rays to the ceiling from which they will be directed downward. Thus the inside portion of the room which is normally darker than the outside half will be adequately lighted. In order to provide this clerestory lighting, a sloping ceiling will be used. This will provide not only improved lighting intensities, but it will also reduce noise by eliminating one parallel surface.

Seats will, of course, be movable. Locker space just outside the door will be provided for each child, and the lockers will be manually operated by the teacher. Toilet rooms will be provided in each room, and the alcove will have work benches and a large amount of storage space. The floors are to be asphalt tile. The walls are to be cinder block, painted in vivid key colors.

The kindergarten room will be similar to



Classroom Unit, Perrysburg Elementary School, Perrysburg, Ohio. The drawing makes clear the area of the corridor and of the clerestory glass brick supplementary lighting.

the other classrooms except that it will be larger, will have a fireplace, and increased glass area. The special or ungraded room will be similar to other classrooms except somewhat larger. Each room will have an outside exit.

The streets of Perrysburg are laid out, contrary to the usual American custom, without regard to the main points of the compass. This fact has been utilized to so orientate the building that the problem of glare from direct south or west light will be eliminated. The possibility of glare will be further reduced by an overhang of the eaves on the more sunny sides.

Each room in the building will be provided with a clock and a radio loud-speaker operated by a master control public-address system centered in the office. The supplementary lighting of the classrooms will be by means of fluorescent fixtures in continuous rows.

The classrooms will be heated by a finned type of convector located under the window seats. Heat will be supplied by a two-pipe high temperature forced hot-water heating system. The water tube steel boilers will be fired by oil burners. The workrooms will be heated by cabinet convectors placed under the workbenches. Classrooms will be ventilated by fan units in passages beneath the corridors. These fan units will receive air from flues extending down from the lighting courts above the corridor roof. A portion of the air will be recirculated from the classrooms into the corridors and thence through combination outside air and recirculating air flues to the fan rooms in the basement passages. A portion of the air from the classrooms and workrooms will be mechanically exhausted through the individual toilet rooms into pipe space back of the toilets from which it will be removed by exhaust fan units and discharged outside the walls. Air will be supplied to separate fan units maintained at 54 degrees by automatic control of outside air, recirculating and vent dampers. Blast coils will raise the temperature of the air from 54 degrees to 75 degrees and serve only for ventilation and air circulation. The recirculating unit ventilators at the entrance will discharge at the floor and recirculate through the top.

The cafeteria and auditorium will be heated by unit heaters, utilizing fresh and recirculated air emitted through ceiling diffusers. Pneumatic, automatic control will be provided for radiators, convectors, unit ventilators, unit heaters, fan unit valves, outside air, recirculating and vent dampers. Low limit aquastats at the most exposed points in each of the eight zoned areas will be provided to prevent freezing.

Drinking fountains will be recessed in corridor walls, and these fixtures together with toilet fixtures will be arranged to suit the size of the children to be placed in the different rooms.

Value of Timely Planning

Throughout the two and one-half years of planning, all the emphasis possible was given to the principle that those who use a schoolhouse should have a part in planning it. Now that the preliminary work is practically over, we know that we are right in asking for plenty of time. But we know too that it is possible to have too much time for planning.

Obviously during our two and one-half years more changes in construction cost have occurred than previously occurred in the history of our country. However, even in normal times, the cost changes over a period of two and one-half years are more than any planning could foresee. There is some danger too in extended planning because of waning interest among those whose sustained help is needed most. There will be personnel changes which require constant repetition of certain acts and discussions. Over a long period more revamping and revising of blueprints than is absolutely necessary will be asked for. Likewise, ideas and equipment will change radically. This note of warning should be sounded also: too long a period of planning causes the formation of pressure blocs whose knowledge of a functional school may be meager but whose wishes become very strong.

We are not ready to erect our planned structures. Costs have trebled since our original cost planning, and we cannot hope to get them lower than double our original estimates.

In closing, we cannot refrain from pointing out what all school people know: Building codes in most of our states are seriously antiquated and provide little help. They are mostly restrictive, regulatory, and hampering. They consider safety only and almost entirely ignore the primary function of a school structure — the instruction of children. Time is marching on and school plans are being brought to completion every day, but nothing at all is being done to revise these hampering school building codes throughout our land.

An Engineer Recalls —

Unit Ventilation—Its History and Progress

G. E. Otis, M.E.[1]

Unit ventilation is no longer a new idea. Nor is it a very old one, either. The first unit ventilator in my experience was a Peerless machine on display at Buffalo, N. Y., in 1914. I was heating and ventilating engineer for the city of Buffalo at that time, and in that capacity was asked to inspect the apparatus. I was not deeply impressed. In fact, my interest was not aroused until two years later, when I was called as an expert witness in a taxpayer's injunction suit against the board of education of Utica, N. Y., asking that the board be restrained from installing unit ventilation in a proposed new building for the Utica Free Academy.

This installation was a large one, involving more than 150 units, and although the suit was filed by a local contractor, it was actually instigated and supported by a group of ventilating equipment manufacturers. I was retained by the plaintiff, who charged that the system selected by the board was inadequate and impracticable for a building of that size and character. There is no question that the main purpose of the suit was to impede the progress made by a few pioneers in unit ventilation. But neither is there any doubt in my mind but what those behind it acted, to a large extent, in good faith.

However, the real issue raised was not settled. After hearing the testimony, the court dismissed the case on the ground that the board apparently had acted in good faith and within its rights. During the preparation and trial of this case I acquired a great deal of firsthand information on unit ventilation and became acquainted with M. G. Hubbard, who had devised the original apparatus. Some two years later, when Herman Nelson purchased Hubbard's business, I accepted the position as chief engineer of his company and have been with that organization ever since.

Hubbard's Earliest Studies

It sometimes takes an intruder to inject new life into an industry. Hubbard was, by training, an electrical engineer and knew practically nothing about heating and ventilation when he first engaged in this enterprise. He simply did not like being cooped up in an office in downtown New York and decided to do something about it. Accordingly, he devised a mechanical window ventilator, which he found did an excellent job in warm weather, but which was of no use in cold weather. He then set about to remedy this defect by incorporating a heating element. This proved more difficult than he had anticipated and he soon found himself confronted with problems of noise, dirt, control, circulation, freezing, and with construction difficulties. But being a student and an ingenious fellow, he eventually solved these problems and developed what he called the Monarch Ventilator.

During his studies Hubbard developed a keen interest in heating and ventilation generally. The information acquired enlarged his perspective and resulted in the development of the Monarch System of Ventilation for schools — the prototype of what is now known as the unit system of ventilation. Because he was not bound by prejudices and conventions, but was impressed by the newest theories in medicine, Hubbard disregarded established practice and introduced certain features which both simplified and improved the ventilation of school buildings. This aroused considerable indignation and protest, as indicated by the trial at Utica and similar incidents. But time has demonstrated the soundness of his ideas, and they have since become common practice.

Meaning of "Unit" System

The nucleus of Hubbard's system was, of course, the Monarch Ventilator. It was this device which distinguished the system from the so-called central fan systems then almost universally used in schools; and it was this machine that caused the system to be generally designated as a "unit" system. I should add, however, that while the two things are closely associated, it is the unitary treatment of the rooms, rather than the unitary nature of the apparatus, that justifies the term "unit system." One room may be equipped with several units, but a single unit cannot serve more than one room.

A number of advantages accrue to treating each room in a school as a wholly independent unit. First, each room need be ventilated only when in use, and to the extent needed. Second, unitary treatment does away with space-taking, costly, unsightly, and unsanitary distributing ducts, and frees the basement of distributing and conditioning apparatus and appurtenances. Third, it greatly reduces the power required for distributing air. Not only must a central fan operate against a considerably greater static head, but it must handle considerably more air to compensate for conduit leakage. Fourth, the unit system assures better air distribution, and is not affected in this capacity by operating conditions. And fifth, conditions in each room can be better controlled.

To partly offset the second advantage enumerated, unit ventilation has the objection of placing extra equipment in the occupied rooms and providing air intakes in the outer walls. This objection had considerable force in the early days, when the equipment was large and ungainly, but it has lost most of its force with modern equipment. Likewise, the third advantage was much less marked in the early days, due to the low efficiency of the small fans and motors in the unitary equipment and the necessity for converting the usual a.c. service to direct current. The use of direct current motors also added to the cost of unit ventilation by requiring a motor-generator set and a separate system of wiring.

Early Objections Met

An objection frequently urged against the unit system in the early days was that a large number of small units scattered all over the building would require a great deal more attention and service than a few large units located in the basement. But time has shown that this objection bears little or no weight. In fact, I have not heard it raised for years. I suppose it is a reasonable presumption that a unit system will perhaps demand somewhat more care than a central fan system, but not enough more to merit serious consideration. The fact is that, aside from occasional oiling and inspection, the only servicing required is to clean the filters. In our own experience, at least, repairs have been a negligible item. Notwithstanding the fact that some machines have been in use for more than 25 years, and some Monarch machines for as long as 35 years, I have yet to hear of one becoming unfit for further service.

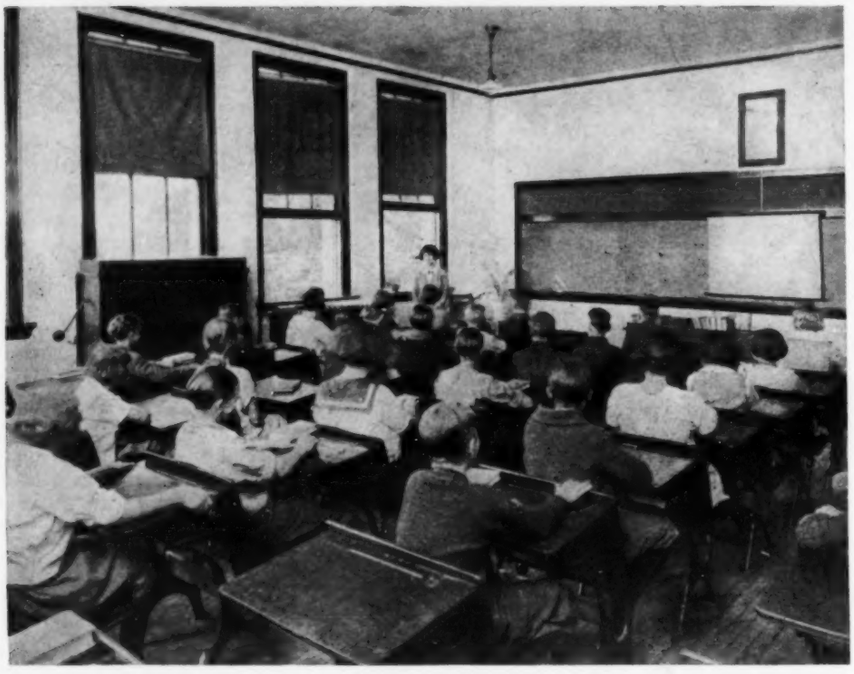
An objection offered against unit ventilation is the possibility of noise. There is no denying the possibility. It was recognized by Hubbard, and has been a problem with which every manufacturer of unit ventilators has coped with varying degrees of success. It was this difficulty, together with speed regulation, that drove Hubbard to the use of direct-current motors. I can safely say that all manufacturers who now specialize in this type of apparatus have succeeded in completely eliminating all mechanical noise. But I can't say as much for air noise.

No one has succeeded in completely suppressing air noise when a unit is operating at full capacity in an unoccupied schoolroom of average construction, and delivering air in sufficient volume and at sufficient velocity to insure thorough diffusion. But machines are now available in which the noise is scarcely perceptible, and is unobjectionable, when the units are operating under normal conditions.

Unique Air Circulation

What really made unit ventilation succeed was not so much the unitary feature, per se, as a unique method of air circulation. I might add that this method of air circulation is only practicable with unitary apparatus and was probably evolved as the result of certain characteristics of the apparatus. The first feature of this method, and the one attributable to

[1]Chief Engineer of the Herman Nelson Corporation, Moline, Ill.



View in a classroom showing one of the first unit ventilators. The machine extended into the room and occupied one-fourth of the middle classroom window.

some extent to the nature of the apparatus, is the delivery of air into the room in a high velocity vertical jet directed toward the ceiling. The second and complementary feature was the restriction of the vent outlets.

By delivering the air toward the ceiling of the room at a comparatively high velocity, a thorough intermixture of air is effected in the upper region of the room and forced down through the occupied zone in a state of mild agitation. The purpose in restricting the vent outlet is to create enough back pressure to prevent short circuits and drafts. As a further precaution against drafts, and to save space and cost, vent flues were dispensed with. The air was discharged from the rooms into the building corridors and allowed to escape from the corridors through roof ventilators. The vent outlets usually consisted of small grilles placed in the lower portion of doors communicating with the corridors. Since the unit ventilators were placed on the outside wall of the room and the vent outlet on a corridor wall, they were usually on opposite sides of the room. But no significance should be attached to this relationship; the respective locations were determined by independent considerations.

By reason of these features, it was possible to maintain a sufficiently high plenum condition in rooms to greatly reduce infiltration and to obtain thorough diffusion. Upon cursory examination, there may not appear to be much difference between Hubbard's method of air circulation and previous practice. But in one all-important particular, it proved to be the difference between success and failure. Air could be safely introduced at a temperature enough lower than that desired in the room to accomplish the necessary degree of cooling — a result which is now recognized as the principal function of ventilation. Under the earlier practice, where the air was delivered into the room in a horizontal direction and at a low velocity, there was a tendency for the air to drop to the floor and cause drafts, if materially cooler than the room air; and this condition was aggravated by stratification and short circuits.

Blast and Split Systems

In order to appreciate what was accomplished, one must go back and review the situation that existed at that time. The first mechanical systems of ventilation for schools were so-called "blast" systems. The air was introduced into the room at a velocity of 300 to 400 feet per minute through a side-wall inlet placed about eight feet above the floor, and escaped through a vent outlet at the floor on the same wall. The vent outlet usually connected with a vertical flue extending through the roof, and was from 75 to 80 per cent as large as the inlet. The system was supposed to introduce the air at a sufficiently high temperature to warm the room in the coldest weather, and provision was made to lower this temperature, as required, by admixing by-passed air of a lower temperature. Generally speaking, these systems were unsatisfactory. Due to infiltration and poor diffusion, it was frequently impossible to properly warm rooms in cold weather, particularly on the windward sides of buildings, and drafts rendered these rooms uncomfortable at other times.

In an effort to correct these faults, the so-called "split" system was devised. In this system, the heating and ventilation were handled separately. Direct radiation controlled by room thermostats was used for heating. Air for ventilation was circulated in the same way as before, but was admitted to the rooms at approximately the temperature supposed to be maintained in the rooms. As a rule, the controlling thermostats, which were located in the air supply ducts, were set to maintain a temperature slightly higher than that desired in the rooms. No provision whatever was made for cooling. Even recourse to opening windows was denied by rules based on the theory that this would interfere with ventilation.

The inevitable result of this arrangement was almost continuous overheating. Temperatures as high as 85 degrees F. were not uncommon in average winter weather and caused widespread complaint. Nevertheless, the "split" system had the almost universal support of the engineering fraternity, and was tolerated by school authorities and the public through fear of what might happen to the children if they were not provided with 30 cubic feet of fresh air per minute. This system was in common use when Hubbard entered the field, and in the light of the times, his accomplishment was a marked improvement.

Corridor Venting

But he did not have easy sailing. Among other things, his handling of the exhaust end of the system evoked considerable criticism. This arose partly from an old notion that the air leaving the rooms would be foul and would fill the corridors with air unfit to breathe. However, the fallacy was so generally recognized — even at that time — that this argument was soon dropped. It was also variously contended that corridor venting would afford an increased fire hazard, and that the open vents in the doors would cause corridor sounds to interfere with study. In fact, it was even asserted that the plenum condition built up in the rooms by vent restriction was dangerous. But these contentions were eventually disposed of for what they were worth. When fire marshals and insurance men were consulted, they said that corridor venting actually reduced the fire hazard, and the other arguments were dropped for want of support.

The fact is that corridor venting had so many practical advantages, in addition to securing better diffusion, that it gained in popularity. It simplified the system, eliminated space taking, costly and draft-producing flues, and effected operating economy by helping to warm corridors. Modern development in unit ventilation has gone a step further and has done away with the door grilles. The air is allowed to find its way out of the rooms through clearances around the corridor doors and crevices around windows. At first, some fear was expressed that with weather-stripped windows and modern building construction, the rate of air circulation would be affected by omitting the vent outlets through the corridor doors. But this has not proved to be the

case. It is reasonable to assume that more power is required to force the air through a tightly constructed room than through a loosely constructed one. However, the extra power required in the case of schoolrooms is not appreciable. Practical experience in thousands of cases has failed to reveal a single instance in which the output of the ventilators has been affected materially by omitting vent outlets.

Improvements in Unit Ventilators

During the years that followed Hubbard's personal departure from the business, up until 1930, the only changes in unit ventilation were improvements in the apparatus. These were manifold, but I shall only mention the major ones. The first of these — at least in magnitude and importance — consisted in completely redesigning the apparatus by substituting a light, compact nonferrous radiator for Hubbard's large cast-iron radiator. This change greatly reduced the size and improved the appearance of the machines, allowed them to be shipped completely assembled, and reduced installation costs and trouble. It also allowed the air intake to be removed from the lower part of the window and placed in the wall underneath.

The appearance of the early unit ventilators was a severe handicap. Most certainly they could not be considered a thing of beauty, and since they were adapted to bring in the air supply through the lower portion of a window, and had to be mounted accordingly, they added conspicuousness to unattractiveness. That they were tolerated is a tribute to the service rendered by them. As redesigned, they were no longer an eyesore, and the demand mounted rapidly. Since then reduced height, improved lines, high-grade workmanship and finish, and arrangements for concealing pipe connections have removed virtually all objection to their appearance.

A second major improvement lay in the substitution of alternating for direct-current motors. This not only did away with the need for a motor-generator set and separate wiring, but further reduced operating costs. Various attempts were made, almost from the start, to use alternating current motors of one kind or another. But these proved unsuccessful because of noise, lack of regulation, or mechanical difficulties until a special condensor type motor was developed for the purpose. The alternating current motors used today in unit ventilators meet every requirement of the service and will operate indefinitely with no attention further than oiling.

The newest unit ventilators do not interfere with the window lighting or with the wall aisle space.

A typical modern unit ventilator in the Elgin High School, Elgin, Illinois.

Adoption of Thermal Theory

However, the greatest improvement in unit ventilation was in the method of operation, introduced in 1930. This change placed unit ventilation far in advance of other schemes for heating and ventilating schools. It not only effected a substantial reduction in the initial cost of heating and ventilation and assured better regulation, but provides for a saving of a third or more in fuel. In fact, this improvement was so revolutionary that it brought about a change in virtually all ventilating codes. I refer to the reduction to practice of the so-called Thermal Theory of Ventilation.

Prior to the introduction of this idea, ventilation practice had always been predicated on what was generally known as the Carbon-Dioxide Theory, although that theory was modified considerably over the years. It dates back to the discovery by a French scientist, toward the end of the eighteenth century, that respiration is a form of combustion, in which oxygen unites with carbon to form carbon dioxide. The really important result of the union — the generation of heat — seems to have been overlooked by the early students of ventilation. Fascinated by the chemical discovery, they focused their attention on the chemical result. They concluded that the notoriously bad atmospheric conditions of crowded rooms was directly attributable to this chemical phenomenon and that carbon dioxide was toxic.

The art of ventilation developed along this line, and it became the object in practice to remove air abnormally charged with this gas and to replace it with so-called fresh air. On the assumption that carbon dioxide is a heavy gas which would naturally settle to the lower level of a room, ventilation was first regarded as a separation process and so-called foul air was drawn off at the floor level and replaced with fresh air admitted above the breathing line. The influence of this concept is still to be seen in such terms as "foul air flues" — used today.

Scientific investigations conducted nearly a century later demonstrated that carbon dioxide is not a poisonous gas. But the notion that it is harmful has prevailed to some extent. For example, it was thought that its presence in more than limited amounts produced headaches and fatigue. A theory was also evolved that air expelled in breathing was laden with toxic organic matter, and that carbon dioxide constituted an index of the extent to which the air of a room had been thus contaminated. But this theory was also

(Concluded on page 85)

For City School Neighborhoods —

Planning School Building Programs

N. L. Engelhardt *

Just thirty years ago the first comprehensive treatise on planning school building programs was being prepared. It has long since gone out of print. Editor Bruce has asked me to review the principles followed in this field of administration since this first publication of mine, and to point out the progress that has been made.

Planning school building programs began, to be sure, with the placement of the first public schools in this country. The earliest method seemed to be to find a piece of land that nobody else wanted, perhaps on the edge of a swamp, at the triangular juncture of two roads, or a rocky area that defied cultivation, and to dedicate it to the lofty purposes of education. Progressing from these early, and perhaps unacknowledged, standards to the basic considerations and techniques of the planning of the present decade has followed a slow and yet evolving and illuminating course. Today probably very few school systems proceed to construct a school building without intensive community analyses and thoroughgoing educational diagnoses, and all of this is reduced to the printed page in a planning brochure or reproduced in the local press. Planning the school plant has become a fixed feature of the training for every prospective superintendent of schools. The professional libraries of every school system list a constantly growing body of literature in this basically important area of administration.

Today the problems associated with planning school building programs may be thrown roughly into ten categories, i.e.,

*Associate Superintendent of Schools, New York City.

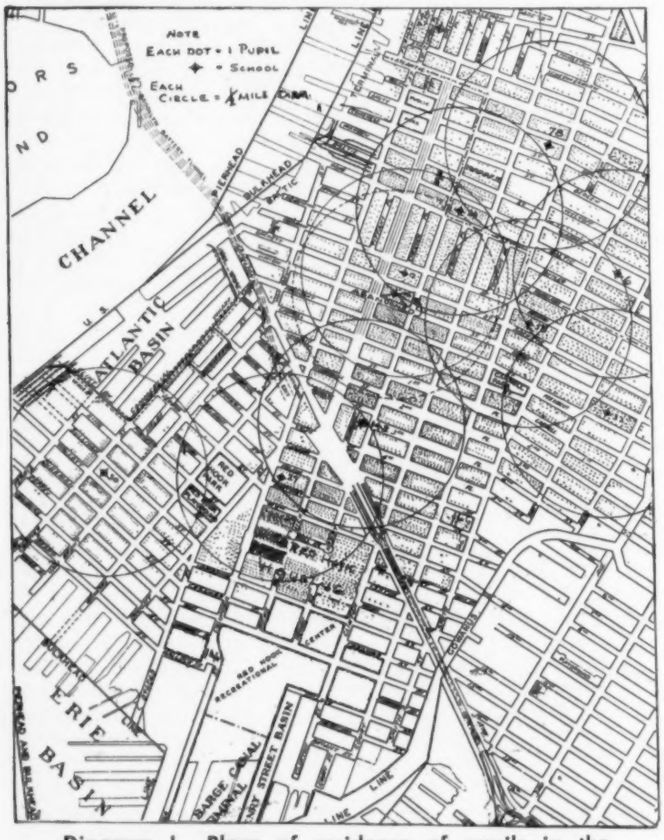


Diagram I — Place of residence of pupils in the schools of the Red Hook-Gowanus neighborhoods.

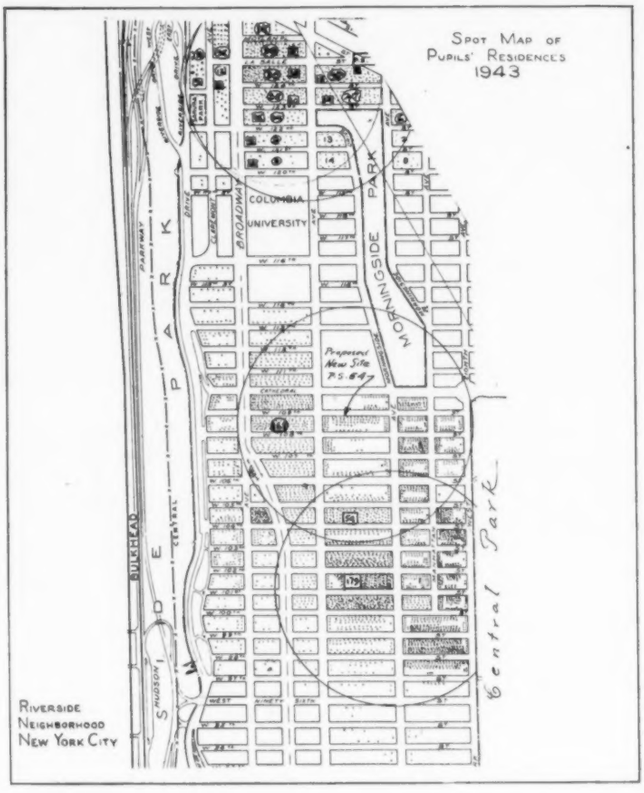


Diagram II — Annual spot map of pupils' residences used for locating schools and readjusting school attendance areas.

1. The analysis of population in all of its combinations and subdivisions pertinent to the educational program.
2. The survey of community residential, industrial, and commercial growth, the future trends and the rapidity of transitions
3. The intergration with the work of community planning agencies, serving traffic, recreation, housing, and other areas
4. The review of the existing educational organization and the future projection of its subdivisions
5. The consideration of all parts of the existing school plant and the determination of their roles in the future building program
6. The agreement on determinants affecting sizes and locations of sites to fit each educational subdivision in the approved organization
7. The professional projection of the program of space requirements for satisfactory educational service in each type of school, and the agreement on educational specifications for each type of space
8. The measurement of the financial ability of the community to meet its school building needs and the suggestion of a financial plan to meet future obligations
9. The selection of school sites with due regard to a comprehensive community plan, with full recognition of all community needs, and with full understanding that the future, with its possible educational changes, must also be served on sites chosen
10. The determination of the building program with inclusion of the rehabilitation projects, the new construction of total and

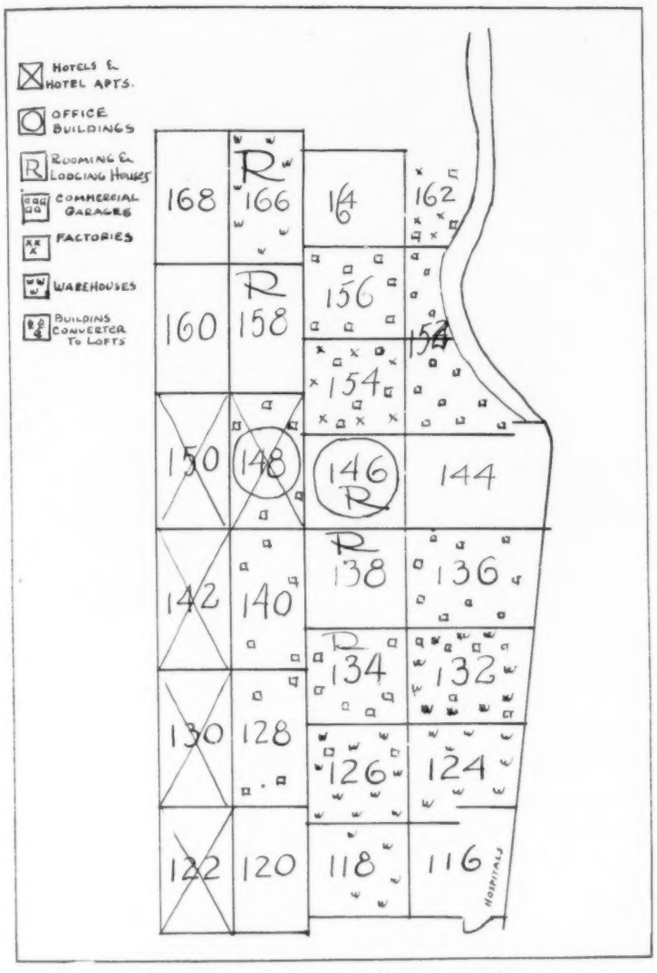


Diagram III — Map showing utilization and occupancy of Yorkville-East Harlem school district.

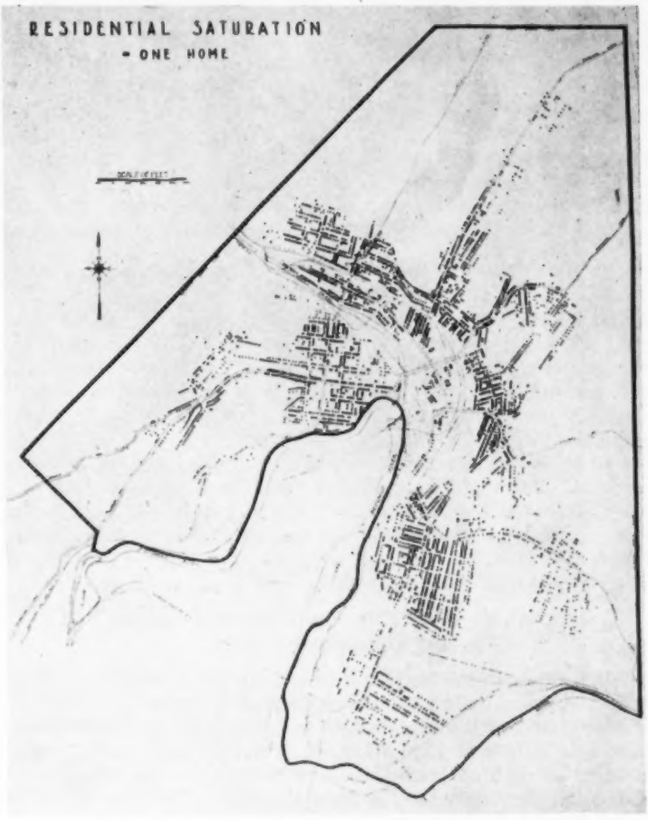


Diagram IV — Greatly reduced map of a school district showing residential saturation.

partial units, and the time spacing of these projects over a five-or ten-year program

While this work is going forward, the board of education and the administrative staff will plan for frequent and preferably constant consultation and discussion of the school building needs with community leaders and groups. The planning of a school building program is a major community enterprise affecting the interests of all citizens. The processes must be democratically pursued. The conflicts must be resolved through the presentation of facts and open discussion. The final programs should preferably have approval by a significant majority of the citizens.

The carrying out of all of these processes before erecting a new school is certainly a desirable advance over the erection of a new school on a site simply because it had in earlier, less precise, days been set aside for school purposes. The impact of the automobile on residential developments, the acceptance of new standards for all aspects of community advancement, the emphasis upon more realistic objectives for the educational and recreational development of our youth and the acceptance of the principle that education is a lifelong task have affected the values to be derived from the school plant and thus its very character. Such influences cannot be ignored if the community is to be adequately served.

Category 1. The Analysis of Population

No school building program can be advanced without an accurate school district map. Every board of education should arrange to have such a map available for its work. Population analyses are best interpreted when clearly shown on such maps. Diagrams I and II illustrate this point. Annually made maps like this show trends. High school students frequently participate in their making.

United States Census Tracts provide the best basis for population comparisons over decades. Adjusting the local annual census to these tracts has obvious advantages. Diagram III shows the census tracts of a section of a large city. Schools serve homes and should be located in areas devoted to residences. The distribution of the houses of a school district, as shown in Diagram IV, offers a good basis for beginning school planning. Diagram V offers another illustration of vacant lands which existed a few years ago but where houses are now being built. The acquisition of sites ahead of need is a good business proposition in such cases.

Diagram VI illustrates four of many different types of use areas in American city development. These variations have many implications for school building planning. Let us consider them for elementary schools. The population is here considered by the acre, but it should be remembered that in calculating the number of persons per acre, less than 50 per cent of the total land surface is available for residential development. Much of the area is required for streets; a smaller portion is required for churches, schools (both public and nonpublic), and institutions of various kinds. A portion of the area is also used by retail stores, garages, and other commercial or industrial establishments which serve the neighborhood. Here, too, there is great variation from neighborhood to neighborhood.

Elementary schools are located to serve neighborhoods, and walking distance for children should be reduced to a minimum. A city plans its schools so that its children do not have to walk long distances. If the school be thought of as the center of a circle, and if this circle has a radius of a half mile, most of the

Diagram V — Map showing residential location in a growing school district.

children living in the circle will be able to get to and from school without being required to travel excessive distances.

Such a circle will contain a little less than four fifths of a square mile, or a little more than 500 acres. The number of public school children in such an area depends very largely upon the type of residential development. Let us consider four distinct types of development, though in actual practice one finds a mixture of these as well as others not represented here.

Type A. One-Family Detached Houses

When this type is fully developed, the density of population averages about 35 persons per acre. A circle with a radius of one-half mile will include a total population of about 17,500, and, in a city like New York, a total kindergarten and elementary school population of about 1670 (9.5 per cent of 17,500).

Type B. Two-Family and One-Family Attached Houses

In areas of this type which have been fully developed, the density of population will average about 70 persons per acre. Such an area for New York City will include a total population of about 35,000, a total kindergarten-elementary school population of 3340, and a public kindergarten-elementary school population of 2500.

Type C. Large Housing Developments

Some large housing developments in New York City have a

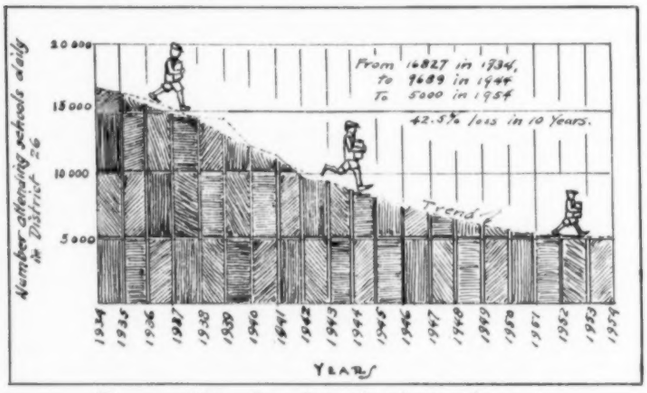


Diagram VII — Trend in school attendance in Red Hook-Gowanus neighborhoods.

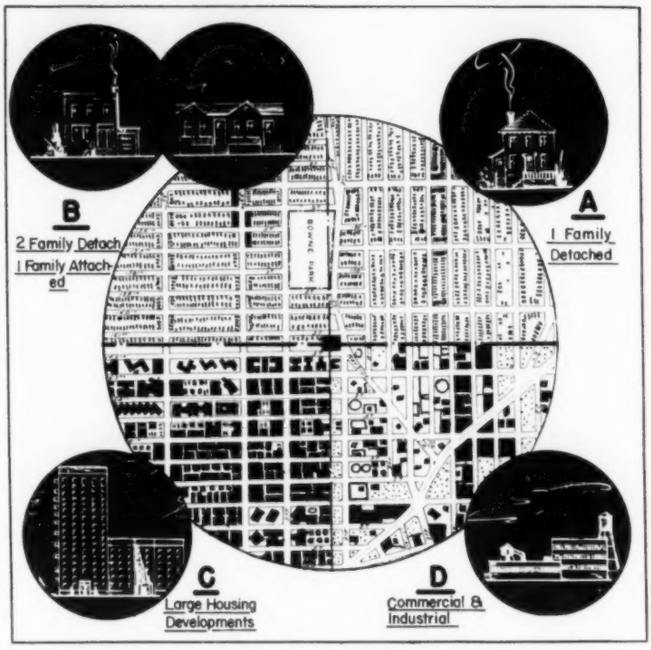


Diagram VI — Map of one-half mile radius largely reduced. The original indicated the location of each house by type.

density of population which averages about 270 persons per acre. These developments may cover 16 or 17 acres and accommodate a total population of about 5000. There is, however, a wide variation here, for Parkchester in the Bronx contains a population in excess of 40,000. Such developments are usually erected on land which has not yet been developed or has previously been used for nonresidential purposes. Since there are such wide deviations from average in this type of development, it would seem that the best which could be done under the circumstances would be to consider the school needs of the development after the plans have been drawn.

Type D. Industrial and Commercial Developments

A large amount of industrial and commercial developments discourages residential development. There seem to be no general rules for forecasting the future developmnt of such neighborhoods. Some industrial areas have no residential population, others have

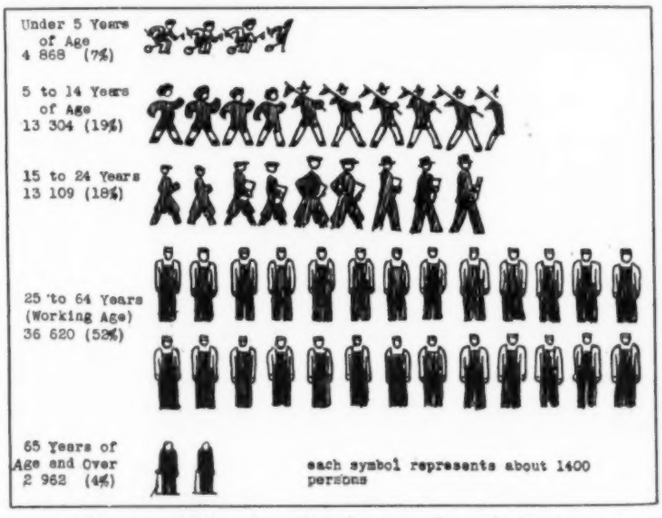


Diagram VIII — Age distribution of residents in a typical school district.

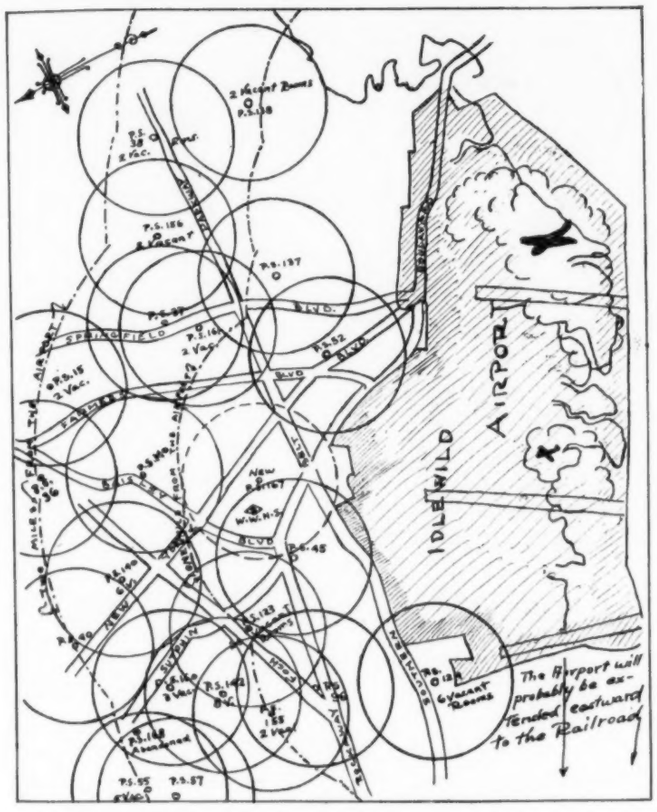


Diagram IX — School zones and vacant classrooms adjoining the Idlewild Airport.

a very small population, while still others have a population of moderate size. Therefore, no formula can be established.

Diagrams VII and VIII illustrate two other of the many types of population analyses which may aid in ascertaining the school building needs. Administrators will select for their own community studies the most effective and most pertinent of the data to present.

Category 2. The Survey of Community Growth

This requires contacts with realtors, the Chamber of Commerce, and with the industrial leaders of the community. Maps showing the location of homes in the community, the zoned areas and the building permits issued, represent types of studies to be made.

Category 3. Integration With City Planning

Many cities have active city planning agencies. If they do not function, their activities should be revived and stimulated. Diagram IX relates school needs to the projection of an airport, which is becoming an increasingly important influence upon community characteristics. The prognostication of the character of the area surrounding airports and the school services to be advanced is a problem that requires intimate integration with the highway, industrial, and commercial proposals.

Through traffic arteries, recreational developments, land reclamation, civic center places, and newly created suburbs are types of many over-all city planning features affecting the location of schools, the size of sites, as well as the services they are to render.

Category 4. The Present and Future Educational Organization

School organizations will not remain static. Changes from the 8–4 to the 6–3–3 have been frequent with the resultant necessity for changing the school plant. Today the 6–3–3 is being expanded here and there to the K–6–4–4. Proposals have been welcomed by parents to the K–3–3–3–3 and to the NS-K–3–3–4–4. In words, this latter means buildings providing for nursery school, kindergarten, and a unit of the first three grades; buildings with provisions for grades 4–6 inclusive; buildings for grades 7–10 inclusive, and buildings for grades 11–14 inclusive. The community must first determine the school organization for which to build, for buildings designed for one purpose cost much money for adjustment to other types of organizations.

Category 5. The Conservation of Desirable Existing Structures

A building program is predicated on the principle of retention of all serviceable existing structures and their rehabilitation, where necessary, to newly conceived purposes. Diagram X indicates for a city section that all A type or fire resistive buildings are to be retained, that all C types or nonfire resistive structures are to be abandoned; that junior high schools are to be built where none existed before, and that elementary schools are to be reduced in number through consolidation. There are many school buildings throughout the nation, which if adequately renovated would continue to serve well, although they have been in existence more than thirty years. Careful planning may make this procedure more economical than new construction, and still result in desirable structures.

Category 6. Location and Size of Sites

The most common errors in school building planning have been the selection of sites that in a short time have proved to be too small, and the location of a site where it serves poorly the group attending the school, or at a point on the fringe of the area to be serviced. To the credit of many school boards, let it be noted that their foresight and courage in selecting 30 to 50 acres for high schools, 10 to 15 acres for junior high schools, and 5 acres for elementary schools, have, through the years, been ap-

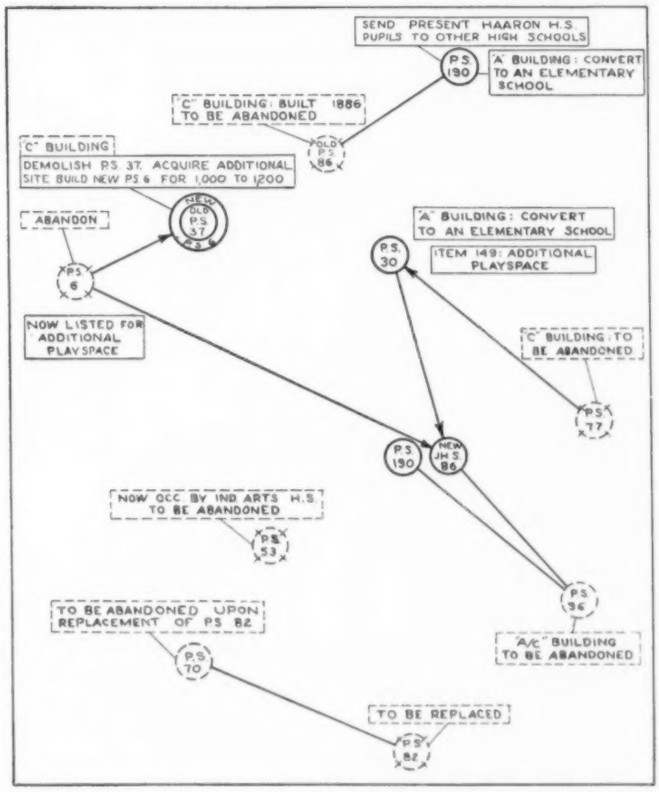

SEND PRESENT HAARON H.S. PUPILS TO OTHER HIGH SCHOOLS
P.S. 190
'A' BUILDING: CONVERT TO AN ELEMENTARY SCHOOL
'C' BUILDING: BUILT 1886 TO BE ABANDONED
POLO (P.S. 86)
'C' BUILDING
DEMOLISH P.S. 37. ACQUIRE ADDITIONAL SITE. BUILD NEW PS 6 FOR 1,000 TO 1200
ABANDON
NEW OCC. P.S. 37 P.S. 6
'A' BUILDING: CONVERT TO AN ELEMENTARY SCHOOL
P.S. 30
ITEM 149: ADDITIONAL PLAYSPACE
P.S. 6
NOW LISTED FOR ADDITIONAL PLAYSPACE
'C' BUILDING TO BE ABANDONED
P.S. 77
P.S. 190
NEW J.H.S. 86
NOW OCC BY IND ARTS H.S. TO BE ABANDONED
P.S. 53
P.S. 36
TO BE ABANDONED UPON REPLACEMENT OF PS 82
A/C BUILDING TO BE ABANDONED
P.S. 70
TO BE REPLACED
P.S. 82

Diagram X — Final map used in re-districting neighborhood.

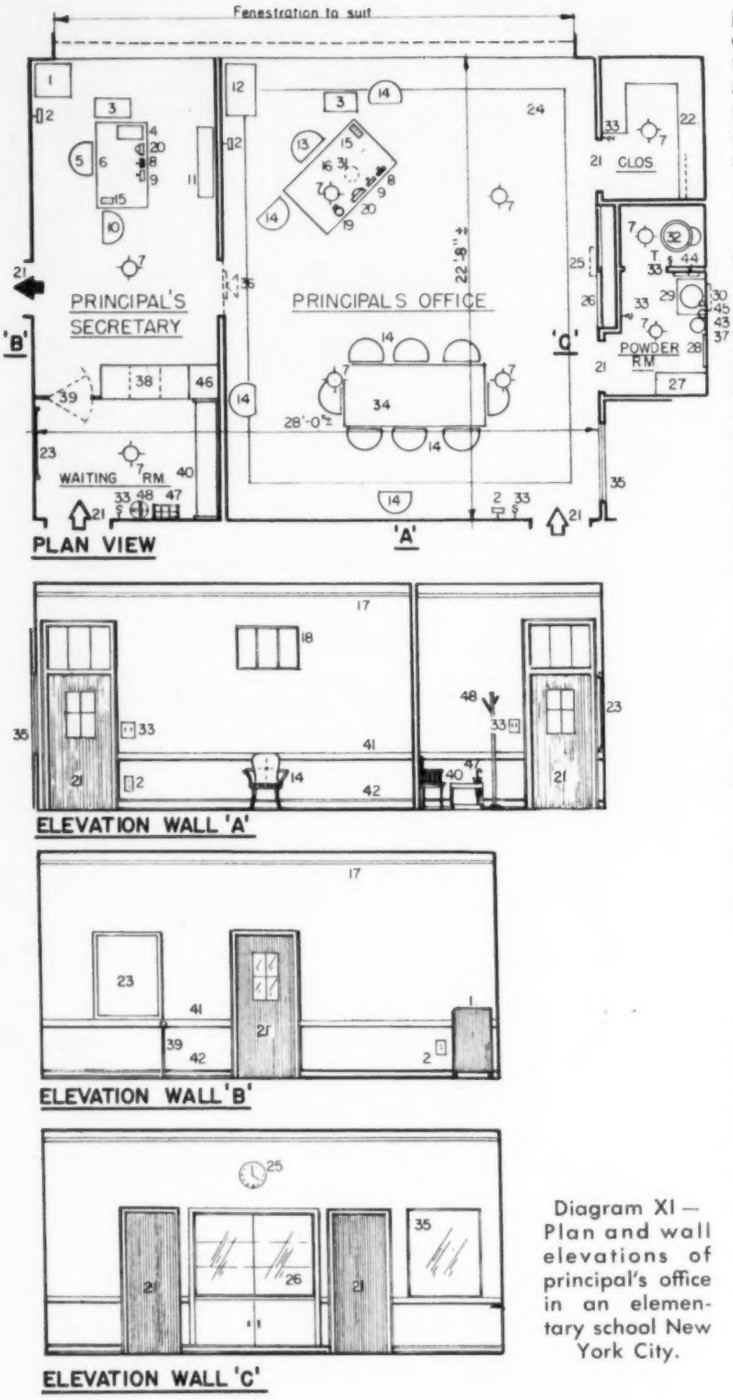


Diagram XI — Plan and wall elevations of principal's office in an elementary school New York City.

preciated widely and approved by their fellow citizens. Extending community service, the expanding requirements of recreation, and the adjustment of the curriculum to meet the needs of individuals are accepted concepts affecting minimal standards for school sites today. City areas congested through the poor planning of bygone opportunities must make as reasonable adjustment to these standards as finances permit.

Category 7. Professional Basis for All Building Decisions

More and more has come to administrative officers the realization that educational spaces must result from group planning. Teachers and supervisors are expected to "deliver the goods," namely to get the kinds of educational results the curriculum, in spite of or in consonance with public opinion, outlines in directives and objectives. Diagrams XI and XII show first a principal's office, the details of which have emerged from conferences of supervisors as well as school clerks; second, an elementary classroom which teachers have planned. This work should be started early in a school building program. It should be carried on without cessation. Its culmination should be a comprehensive building manual like those produced in New York City, Oklahoma City, and Cincinnati. Where such a task appears too formidable for a small community, perhaps joint action by a group of such will produce the desired result.

Category 8. The Measurement of Financial Ability

This should not be a spasmodic or intermittent service to the community, nor should the community be permitted to feel that all school building financing must be done through taxing local real estate. Federal aid was once granted in liberal amounts through the PWA. State aid is possible where extensive and new tax programs are resulting in concentration of public monies in state hands. Today the increased cost of construction, in many places double that of 1940, makes new school building an impossibility in many communities until new financing is made available or costs recede. The American people need new school buildings now. They will not be content with portables or combustibles. Hence the great need for renewed emphasis upon the financing problem.

Category 9. Development of a Comprehensive Site Plan

Some day a competent researcher will show the desirable percentage of a community's area that should be devoted to education and its related recreation program. Considering the importance of education in the advancement of communities, there has been contentment too long with too little land. Education's program also requires protection against extensive residential housing developments without initial consideration and assignment of lands for educational purposes. Large-scale housing projects or realtors' subdivisions of adandoned estates, or previously undeveloped areas without the inclusion of provisions for educational needs, should not be possibilities in American communities. "There ought to be a law" and no doubt there will be soon.

The undesirable fact is that in most instances not enough land is set aside for education, and not enough consideration is given this need before conflicting developments already begin. A community's school site plan should be built with courage, vision, and

Legend:

1. Safe, 20 x 20 x 40 inches
2. Duplex Receptacle
3. Telephone Stand, Type B, 20 x 14 inches
4. Seven Tray Visible Record Cabinet
5. Revolving Arm Desk Chair
6. Flat Top Typewriter Desk, 60 inches, Type B.
7. Ceiling Light
8. Inter-Communicating Telephone
9. Outside Telephone
10. Side Chair
11. Bookcase, Type B
12. Three Drawer Filing Cabinet, Legal Size
13. Revolving Arm Desk Chair, Leather Upholstered
14. Side Arm Chairs, Leather Upholstered
15. Buzzer, to Gen. Office and Secy. Office
16. Flat Top Desk, 35 x 66 inches
17. Wood Picture Moulding
18. Partition Sash
19. Microphone
20. Desk Lamp
21. Door
22. Wood Shelves, Short Clothing Rod Under
23. Bulletin Board
24. Rug 15 x 20 inches
25. Electric Clock
26. Recessed Bookcase (Storage Under)
27. Wood Shelf
28. Full Length Mirror 24 inches wide
29. Wash Basin
30. Medicine Cabinet
31. Outlet in Floor under Desk
32. Water Closet
33. Light Switch
34. Table, 72 inches, Type A
35. Soundproof Window in Radio Control Room
36. Loudspeaker with cut-off switch
37. Paper Receptacle
38. Counter High Files, Legal Size, Linoleum Top
39. Swinging Low Gate
40. Wood Settee, 6 foot
41. Chair Rail or Wainscot
42. Base
43. Paper Cup Dispenser
44. Paper Towel Dispenser
45. Soap Dispenser, Liquid
46. Steel Clothing Locker
47. Umbrella Stand
48. Costumer

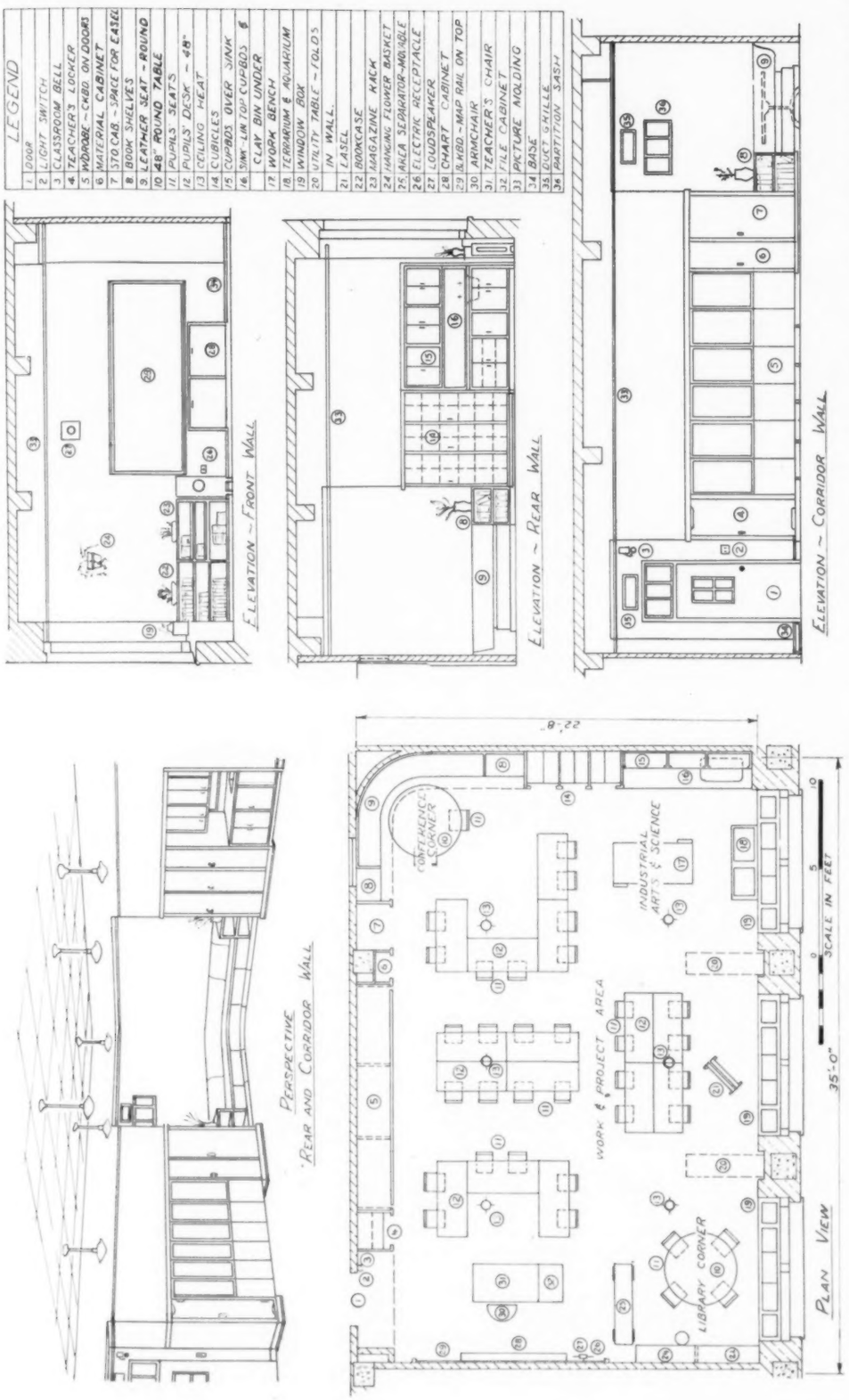


Diagram XII — Plans and elevations for new type elementary schoolroom in New York City postwar school buildings.

conviction. There has been much debate in past years about site selection and purchase in advance of actual need. Regardless of the financial aspects of this problem, it should be borne in mind that losses in educational opportunity can never be retrieved, and that in the long run the greatest financial asset a community has is a citizenry educated, trained, and practiced in the fields which have made the most of their talents and hopes.

Category 10. The Complete Statement of the Building Program

The underlying criteria here are:

a) Comprehensiveness to serve all geographic sections as well as all groups that will be served

b) Coverage over a reasonable time period

c) Emphasis on, and workable suggestions for, rehabilitation of retained units

d) Definiteness of purpose or underlying philosophy of each unit to be erected

e) Clarity of educational specifications for all spaces in each proposed structure

f) Distinction between the positive essentials and the determinables, should limitation of funds dictate

g) Clarification of steps to be taken in furtherance of program

The problems of small communities tend to differ from those in large cities in intensity and quantity rather than in kind. Forecasting school building needs and laying out school building programs are stimulating activities for all. Through them, the real character of a community may be defined and the hopes for the future outlined. Where the school building program is static or nonexistent, the ghost town may be only a few years in the offing.

Perspective of the Proposed High School Building, Southington, Connecticut. — Ernest Sibley, Architect; J. E. Nichols & Ernest Sibley, Jr., Associate Architects, West Hartford, Connecticut.

The Proposed High School for the Town of Southington, Connecticut

Ernest Sibley, Architect
John E. Nichols and Ernest Sibley, Jr., Associated

The town of Southington, Conn., having far outgrown the old high school building erected in 1874, is laying its plans for a new plant that will fill educational and community needs which have long been neglected.

As was the rule when built, the old high school structure was situated on a piece of land barely large enough to accommodate the building alone. Education then involved the intellect of the pupil to the virtual exclusion of his physical, his recreational, and his social interests, and those of the adult community.

The resulting limitations have been of growing concern to not only the educational authorities but to the residents of the town as well. The building committee which was finally appointed was therefore determined that this situation should be corrected. Besides a building of adequate size and up-to-date academic facilities for the increased enrollment, the committee desired one which, with its site, would provide for physical education, recreation, athletics, civic and cultural activities.

Centrally Located Site

The site for such a plant could best be located centrally in the town, for convenience of access and for close relationships with other community facilities. It would also need to be of generous size. Fortunately there was one tract of available land which met both of these criteria. But it was an uneven piece of ground, high here and low there.

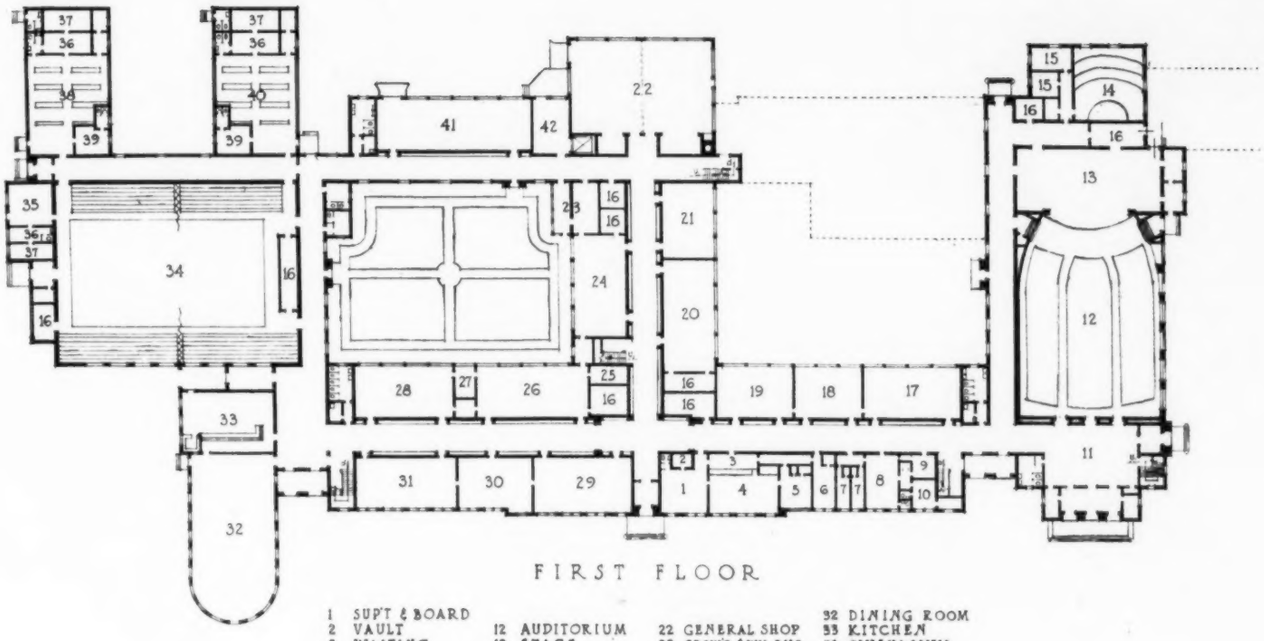
In view of its most favorable location and its size, the committee decided to purchase and use it despite its surface irregularities. Foreseeing what might be a considerable delay in the actual construction of the building, and realizing the pressing need for outdoor recreational space, the committee was determined to go ahead with the development of the site immediately, rather than to wait until building operations could begin.

Accordingly, it engaged both an architect and a civil engineer to work out co-operatively a scheme that would utilize the potentialities of the site most effectively and economically.

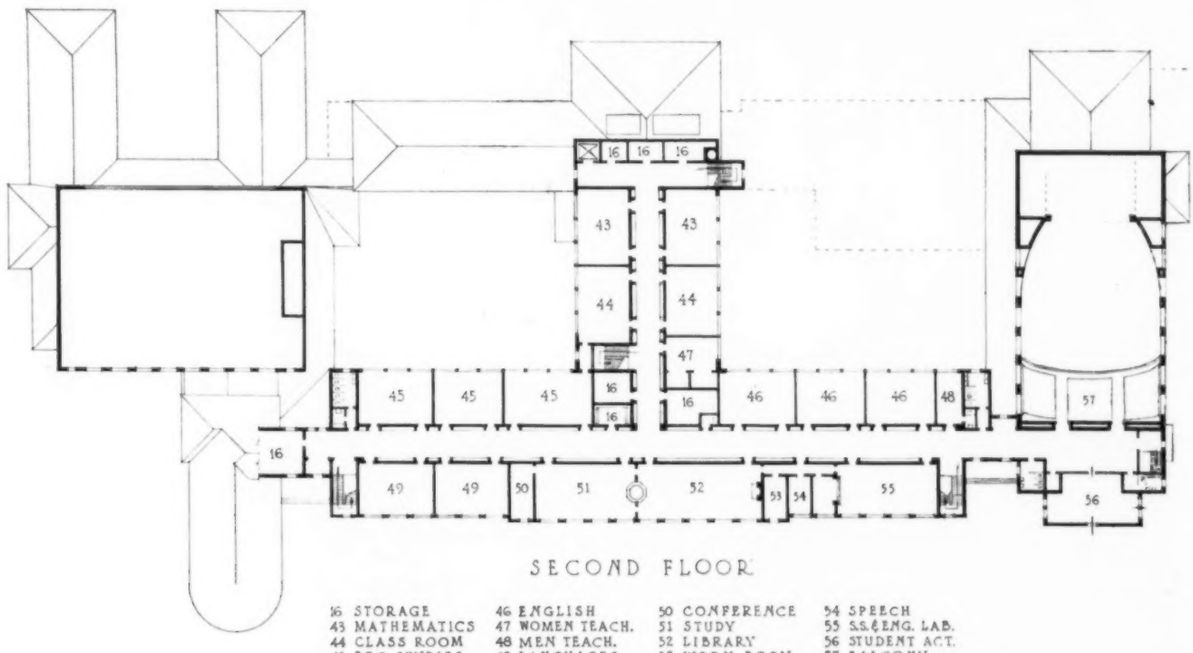
The area selected for the building itself existed as a veritable hill overlooking the principal adjoining street. This hill has been cut down to form a gentle slope rising from the sidewalk, and the excess earth has been used to fill and level out the low, uneven ground to the rear which had been decided on for the play field. Here, immediately behind the building, a football field and running track have been laid out, utilizing the slope from the building above for bleacher space. Beyond lies the area for the soccer and hockey field, baseball and soft ball diamonds. A crescent of high land on the edge of the property to the south has been terraced for five tennis courts, and a wooded knoll to the west has been left in its natural state as a picnic area. In all, 160,000 cubic yards of earth has been moved and the ground prepared for seeding.

School and Community Uses Planned

More recently a movement has been started to raise by popular subscription a fund for the construction of a memorial stadium on the



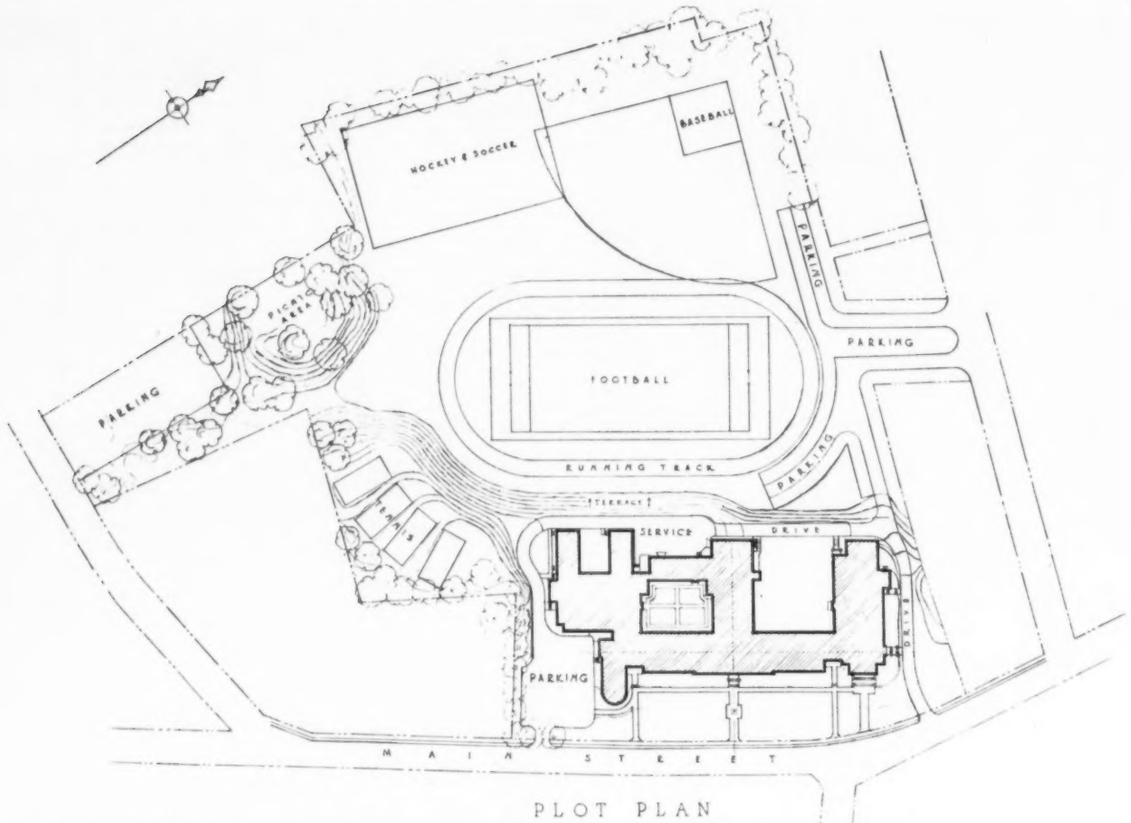
Proposed High School Building, Southington, Connecticut. — Ernest Sibley, Architect; J. E. Nichols & Ernest Sibley, Jr., Associate Architects, West Hartford, Connecticut.



ERNEST SIBLEY · A.I.A. · ARCHITECT
J.E. NICHOLS & E. SIBLEY, JR. · ASSOCIATED
WEST HARTFORD · CONN.

PROPOSED HIGH SCHOOL BUILDING
SOUTHINGTON · CONNECTICUT

SCALE IN FEET



PLOT PLAN

ERNEST SIBLEY · A.I.A. · ARCHITECT
J.E. NICHOLS & E. SIBLEY, JR. · ASSOCIATED
WEST HARTFORD · CONN

PROPOSED HIGH SCHOOL BUILDING

SOUTHINGTON · CONNECTICUT

SCALE IN FEET

site. The supporters of this movement plan on the provision of field house facilities in connection with the stadium which will supplement the gymnasium showers and lockers to be provided later in the building itself.

Three car parking areas are planned. Two of these, at the level of the playing field, are intended for use in conjunction with athletic events and community recreation. A third, primarily for the school staff and visitors, is situated close to the proposed building. Immediately to the north of the auditorium is a piece of land yet to be acquired which can be developed as a parking lot for townspeople who will use the building in the evening.

Architectural and Community Harmony

The preliminary plans which have been developed for the building do not follow the modernistic trends now so much in vogue. While free of useless detail and ornamentation, the design acknowledges the architectural pattern which has evolved in this New England community, and seeks to conform without subservience of function.

The plan has been limited to one and two stories for the sake of convenience, economy, and appearance. Those elements which may be expected to be most utilized for community purposes — the auditorium, the gymnasium and dining room, the cafeteria, and the shop — have been so designed that they may be entered directly and conveniently, and may be used without the need for access to, for heating or for the policing of other portions of the building.

Following the desires of the building committee, the gymnasium has been designed with folding bleachers for a thousand spectators. The floor is divided so that each half may be entered and used independently. Not shown on the accompanying sketches are provisions for the addition of a swimming pool in the future, tied in with the gymnasium dressing rooms.

The cafeteria on the main floor level is convenient of access for community suppers and meetings. Its proximity to the gymnasium makes possible its use in connection with that unit, for dances, exhibits, etc. The abundance of windows around three sides of the room, its finish and appointments, will fit it for numerous activities aside from its primary use of lunching.

Self-Contained Auditorium

The auditorium, too, is planned as a self-contained unit with separate entrance, toilets, and steam mains. The stage is entirely accessible from the corridor and also from the music unit to the rear. The slope of the ground is such that a large storage area immediately beneath the stage and music unit opens at grade to the outdoors. A portion of this area is set aside for the storage of mowers, rollers, and other outdoor tools.

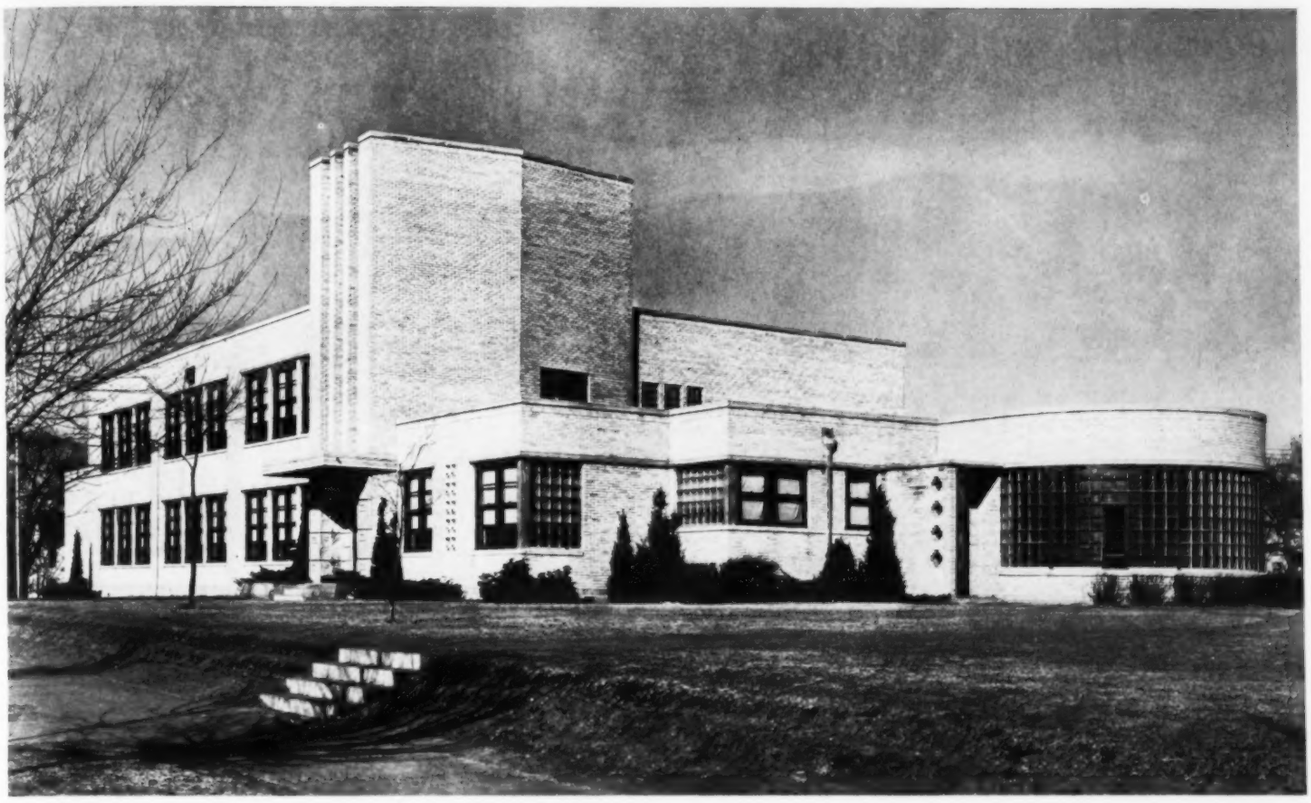
The general shop, 40 by 60 feet with possibilities for subdivision, is situated at ground level for convenient access and at a point where noise will not interfere with school activities. Near it is the agriculture laboratory and shop in which many activities will be related to those of the general shop.

In the same area is situated the receiving room with the loading platform on the service court and a lift for moving supplies and materials between this floor and the second floor and boiler room.

Another feature worthy of mention is the provision of a student activities room. This is situated over the lobby of the auditorium and is intended for the exclusive use of the various school organizations.

The enclosed court arrangement of the building is designed to reduce corridor travel and provide for congestion-free circulation of pupils from room to room. This arrangement also increases the proportion of corridors which may receive light directly from the outdoors.

There are no rooms whatever with their floors below grade excepting for the boiler room and the understage storage room. First floors are to be concrete slabs on gravel fill, spanning pipe trenches around the entire perimeter of the building. The second floor construction is to be fireproof. The bearing walls are to be of brick, and the roof is to be heavy weather resisting slate.



General View from the Southeast, Garfield School, Abilene, Kansas. — Jos. W. Radotinsky, Architect, Kansas City, Kansas, and Frank Cayton, Associate Architect, Abilene, Kansas. The tower houses the air intake, the ventilating fans, etc.

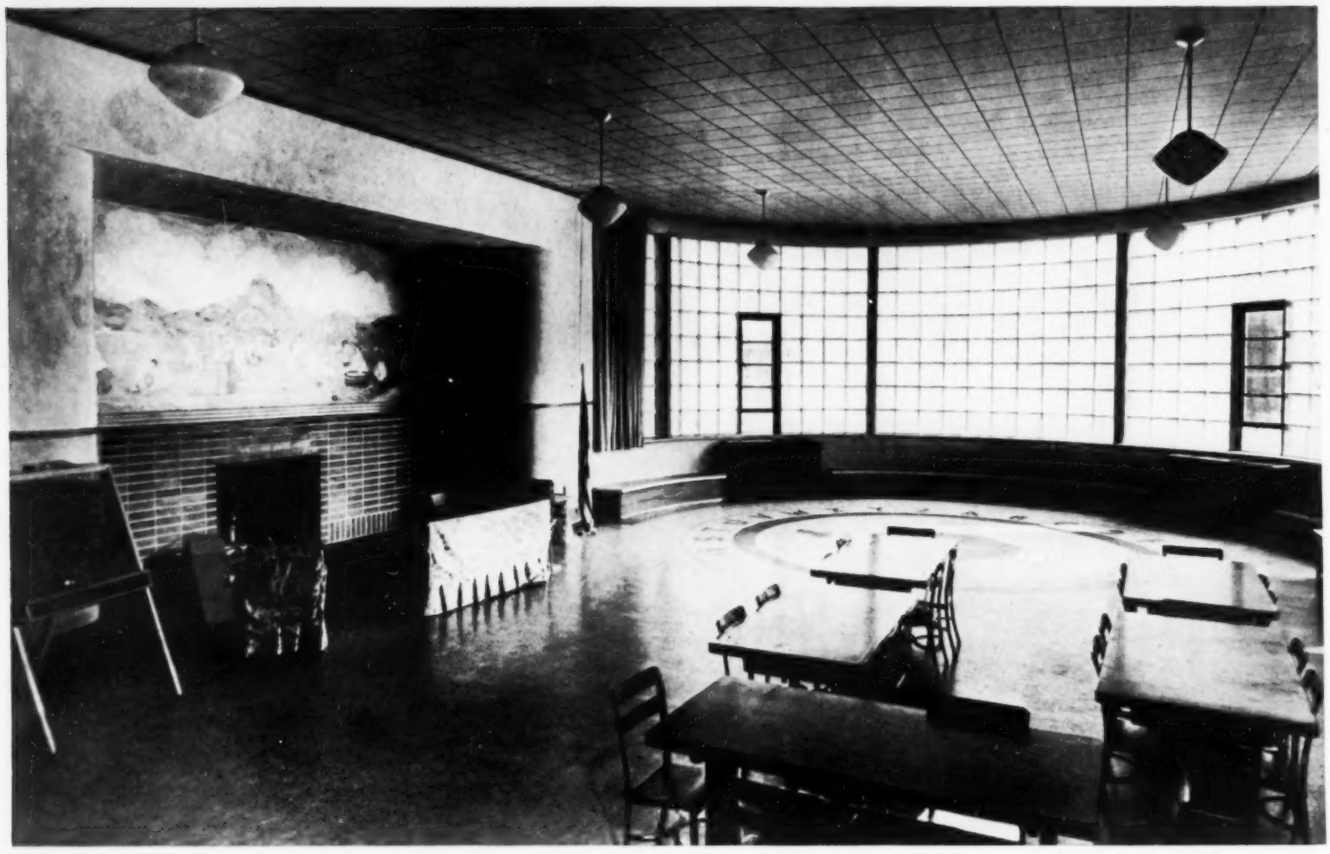
The Garfield School at Abilene, Kansas

W. C. Robinson, Superintendent

Garfield School was the first unit of a long-range school rehabilitation and replacement program activated by the board of education of Abilene, Kans., during the year 1940. The citizens approved bonds in the amount of $107,250 to be used in the construction and equipping of the Garfield School, and of the McKinley School, both elementary school units. At the time, the board realized that any monies appropriated by the school district would require additional funds from the Federal Government to meet the costs of construction. Accordingly, aid was requested from the Works Progress Administration for both labor and materials to supplement the amount assigned to this project as the sponsor's contribution toward cost. Approval was received, and work was started during the latter part of 1940; the structure was completed in 1942.

The educational requirements were studied by the board of education, in co-operation with a survey made by the University of Kansas, and then submitted to the architects for the development of the functional plan. The plan is arranged in a manner that will permit the use of the activity room with its stage, without the use of the remaining building; or the use of the academic section without the use of the activity space or interference with the administrative area. The kindergarten is so placed that students have their separate entrance and also a definite area

A typical classroom showing the movable furniture, the limited chalkboard, and the built-in wardrobe.



The kindergarten is harmoniously finished with a fairy tale mural above the fireplace, colorful inlaid linoleum floor, and sound absorbing ceiling.

of playground which is set aside for their play.

The building is located near the center of population of a permanent residential area of the city, and therefore serves both educational and community functions.

The exterior of the building is of light, buff brick with stone trim; the interior is of reinforced concrete frame with fireproof walls and finish materials selected on the basis of minimum maintenance requirements.

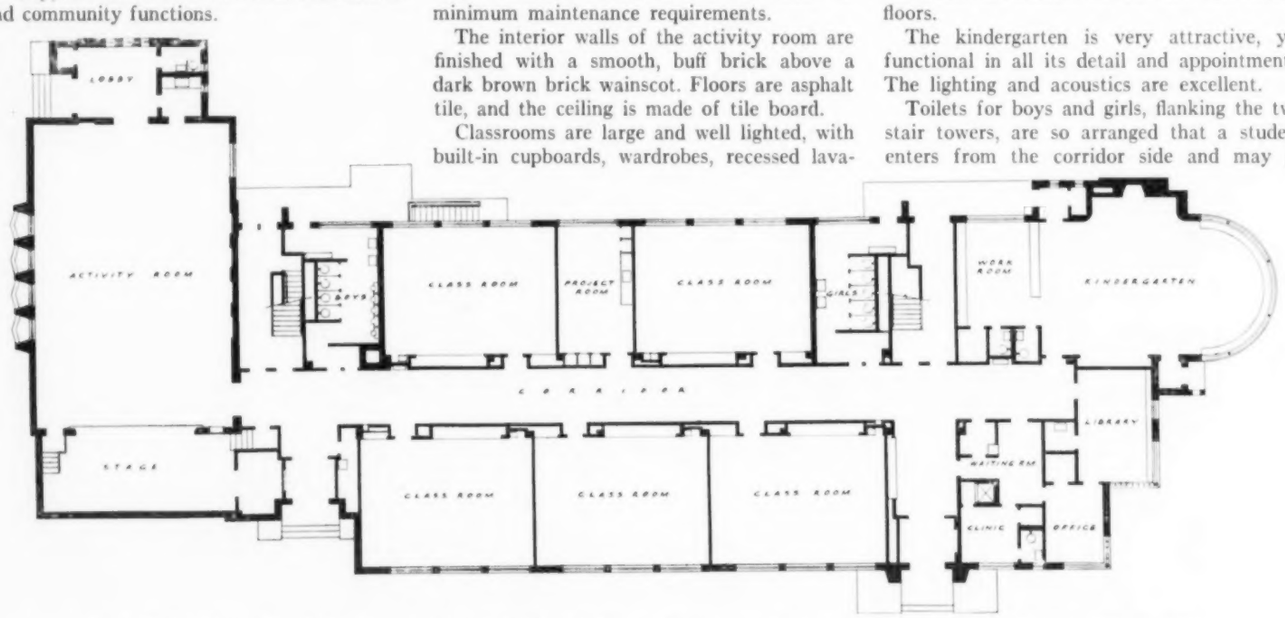
The interior walls of the activity room are finished with a smooth, buff brick above a dark brown brick wainscot. Floors are asphalt tile, and the ceiling is made of tile board.

Classrooms are large and well lighted, with built-in cupboards, wardrobes, recessed lavatories in the walls, and ample blackboard and tackboard space.

Project rooms with built-in cases, counters, and sinks are located on the first and second floors.

The kindergarten is very attractive, yet functional in all its detail and appointments. The lighting and acoustics are excellent.

Toilets for boys and girls, flanking the two stair towers, are so arranged that a student enters from the corridor side and may go



First Floor Plan, Garfield Elementary School, Abilene, Kansas. — Jos. W. Radotinsky, Architect, Kansas Cit, Kansas, and Frank Cayton, Associate Architect, Abilene, Kansas.

The corridors in the Garfield School have been finished to require minimum maintenance and to produce maximum quiet.

The library is fitted with child's size furniture and bookcases.

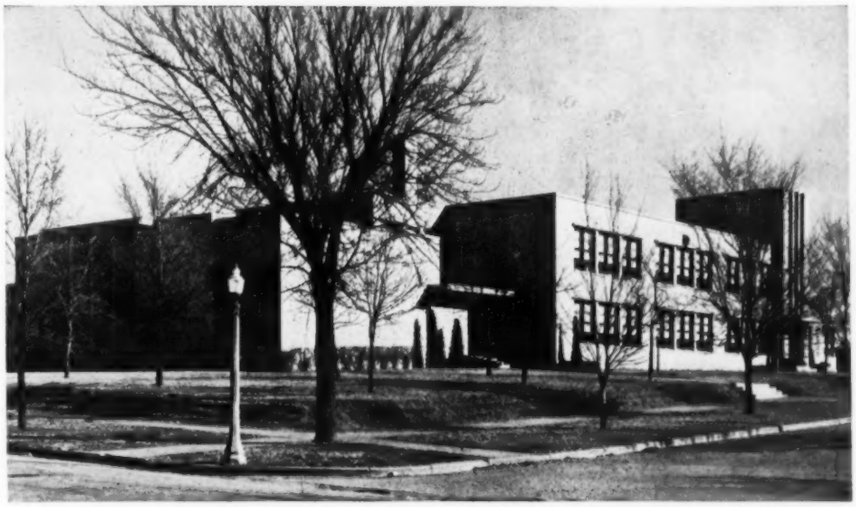
directly to the playgrounds without returning to the corridors of the building.

The administration unit provides space for the principal's office, waiting room, clinic, and library, the spaces allocated being functional, economical, and practical.

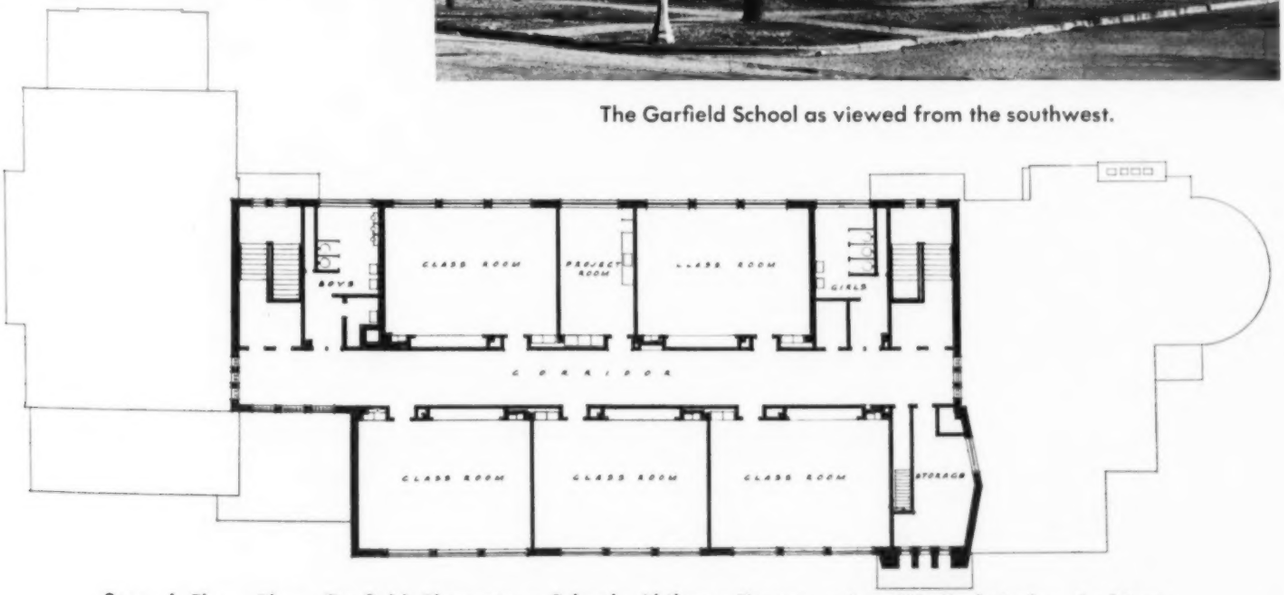
Each classroom is lighted with six incandescent, enclosed light fixtures, the three lights parallel to the exterior wall controlled by one switch, and the three lights parallel to the inside wall controlled by another.

Heating and ventilating are accomplished by the split-system method, which is very desirable in this part of the country.

The building is designed in a manner that will permit the addition of two classrooms at a later date.



The Garfield School as viewed from the southwest.



Second Floor Plan, Garfield Elementary School, Abilene, Kansas. — Jos. W. Radotinsky, Architect, Kansas City, Kansas, and Frank Cayton, Associate Architect, Abilene, Kansas.

Planning the School Building Program*

*Harold H. Church, Ph.D.***

(Concluded from December)

Planning a Building

One of the main objectives of educational and school building surveys is to provide reliable data to plan an adequate and functional workshop or school plant. This information, when placed in the hands of the architect, will serve as a guide to the design, location, and equipment of the new school building. Before proceeding with the initial plans of the building, the architect and the school administrator will do well to give consideration to the following trends.

Traditional vs. Mosaic Planning

Traditionally, the architect usually lays out a ground plan which is properly proportioned so as to have symmetry, balance, and eye appeal. Then, the classrooms and laboratories are placed in the plan, by and large, as they fit into the design and layout of the ground plans. In other words, the ground plan of the building is laid out and the educational plans are made to fit into the traditional pattern.

In planning the Elkhart Junior High School, the architects[1] and the superintendent agreed to approach the initial planning from a functional standpoint and leave the over-all arrangement of the building, design, and layout until last. The floor space, room height, and functional use of each individual department was considered, and the room or department laid out accordingly. After all of the departments and individual units had been laid out, the architect then located and grouped the departments, mosaic fashion, oriented according to their function and use. When all units were placed, the final design and layout of the building were made.

The writer has found through experience that architects are reluctant to change their building plans once they have decided on a design and floor plan. By using the mosaic plan only one department needs to be changed and it can be changed repeatedly without affecting the general floor plan of the building and causing the architectural firm to redraw a complete new floor plan. Besides the many and obvious educational advantages to this kind of planning, a better working relationship is promoted between the architect and the school administrator.

Authoritarian vs. Staff Planning

A second trend in school planning is toward widespread staff participation and away from the authoritarian planning of the educational and architectural experts. The members of the school staff who daily work in the classrooms are more likely to know how rooms can be laid out to function more effectively and become a better educational workshop than either the superintendent or the architect. Some teachers will be impractical and even extravagant in their suggestions, but with the guidance and advice of the architect on technical matters and the superintendent on educational needs, a truly functional department can be designed. Besides the functional advantages gained in calling in the school staff to help plan the building, the morale of the staff is increased and a greater pride and interest are taken in the new school plant.

The Community Wing

A third trend is toward a wider use of the school plant by the adult community during the time that regular classes are not in session. The community investment in a total school plant is too great to let the school building stand idle 40 to 50 per cent of the time during which they could be used for community activities. The amount of time, exclusive of the hours from 10:00 at night until 8:00 in the morning, that the average school building is used for school purposes during the year is plotted in Figure I. This does not take into consideration the fact that the average school does not use the building for school purposes on Saturdays and Sundays.

Architect's Sketch,

The public is beginning to be conscious, more and more, of the fact that education is a lifelong process and that it continues informally for the adult after the school day. Because of this trend the modern school building should be planned so that the departments of the school, which can be used by adults during the out-of-school hours, are grouped together. And the building as a whole is arranged so that the community wing of the building can be shut off from the main building at night. Departments in the school which may have a functional use by the public are the auditorium, gymnasium, library, shops, home economics, music, art, cafeteria, and general purpose rooms.

DESCRIPTION OF ELKHART'S NEW JUNIOR HIGH SCHOOL BUILDING

The new Elkhart Junior High School building was planned after carefully considering the needs of the school and the community. It was designed, mosaic fashion, so as to be as functional and practical as possible, limited only by the financial ability of the community. It will provide for the immediate housing

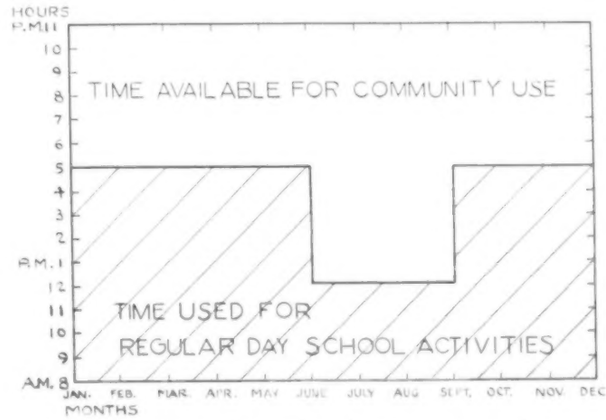


Fig. I — Planned school and community use for Elkhart, Indiana, high school.

*This is Part III of a comprehensive paper and represents principles and methods used in developing the Postwar School Building Program of the Elkhart, Ind., school system.

**Superintendent of Schools, Elkhart, Ind.

[1]Maurer & Maurer, Architects, South Bend, Ind.

Proposed Junior High School, Elkhart, Indiana. — Maurer & Maurer, Architects, South Bend, Indiana.

of approximately 900 pupils but will be designed to house ultimately 1300. The building will be two stories in height, constructed of red brick with the exception of the central façade which will be of concrete to accentuate the height. The ground under the building will be excavated as a matter of insulation, but only portions of it will be constructed for storage purposes. The heating plant will be housed in a separate unit. The building will be erected on a flat 22 acre site which is located as close to the center of the pupil population as possible.

Expansive Gymnasium

Two gymnasiums, the size of the average gymnasium floor, separated by a motor operated folding partition, can be opened into a single large floor. Adjacent to the same floors are to be complete facilities for dressing rooms, equipped with individual lockers, first aid rooms, and offices for both boys and girls. The gang showers are of "U" design with the shower controls operated from a central outlet.

Off the same corridor of this public wing is the opening to an auditorium planned to accommodate approximately 1200 persons. A full stage with ample dressing rooms and space for equipment and materials is provided.

A corridor to the left of the auditorium leads to the instrumental music department, located opposite the stage. This department, it is planned, will be as fine as it is possible to find in any junior high school building. It consists of a large rehearsal room fully equipped with cupboards for storage of large instruments and with side rooms for music appreciation and recordings, music storage rooms, and four individual and ensemble rehearsal rooms separated by a corridor from the main rehearsal room. Above the rehearsal rooms, also, commodious cupboards are available for storage of uniforms and other band paraphernalia.

Big Shop Section

On the second floor, directly above the instrumental music department, are two vocal music rooms similarly equipped with storage space and individual practice and rehearsal rooms.

The corridor to the right of the auditorium leads to the general shops, which are to house units for instruction in metal turning, sheet metal, auto mechanics, photography, woodworking, pattern-making, wood turning, electricity, plumbing, plastics, printing and drawing, a pupil conference room, and a library.

On the second floor above the general shops is a complete and wholly modern home-economics unit. This department is to contain a large sewing room fully equipped with cutting tables, folding ironing boards, lavatory, a fitting room, sewing machines, and the like.

Home Laboratory

Between the sewing room and the foods laboratory is a large area which provides space for a dining room, living room, and bedroom. The equipment here is to be so constructed that it can be moved aside and the beds rolled into closets, so that the room can be used as a large social room for gatherings of students or the public.

Adjacent to the social room is a foods laboratory which houses six unit kitchens, each completely equipped. There is also a laundry and a lavatory unit.

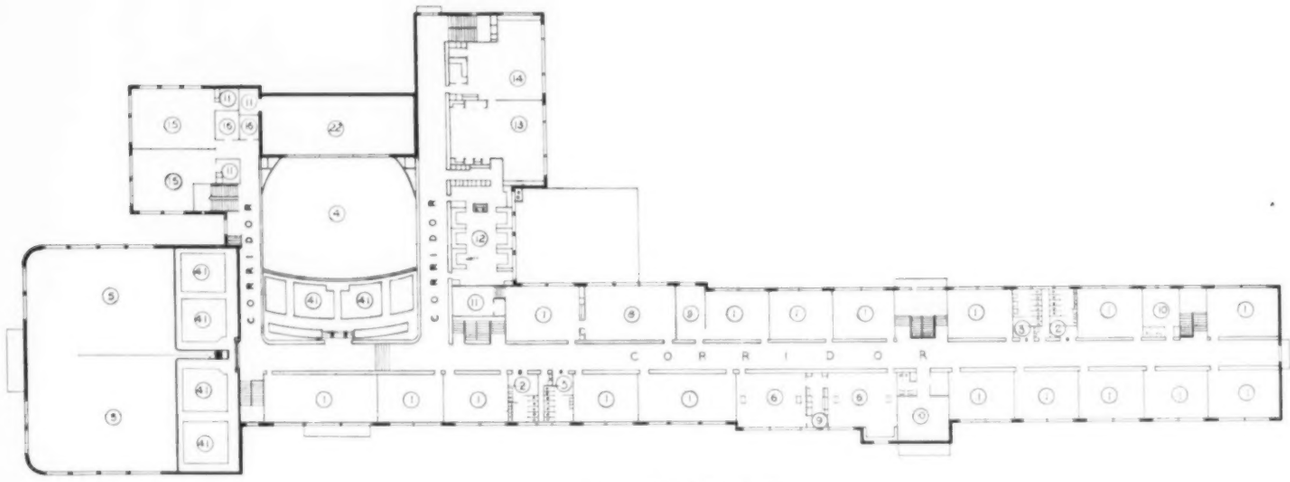
The main entrance to the home-economics department is by way of a large double door with glass panels on either side simulating the entrance to a home.

Cafeteria for 300

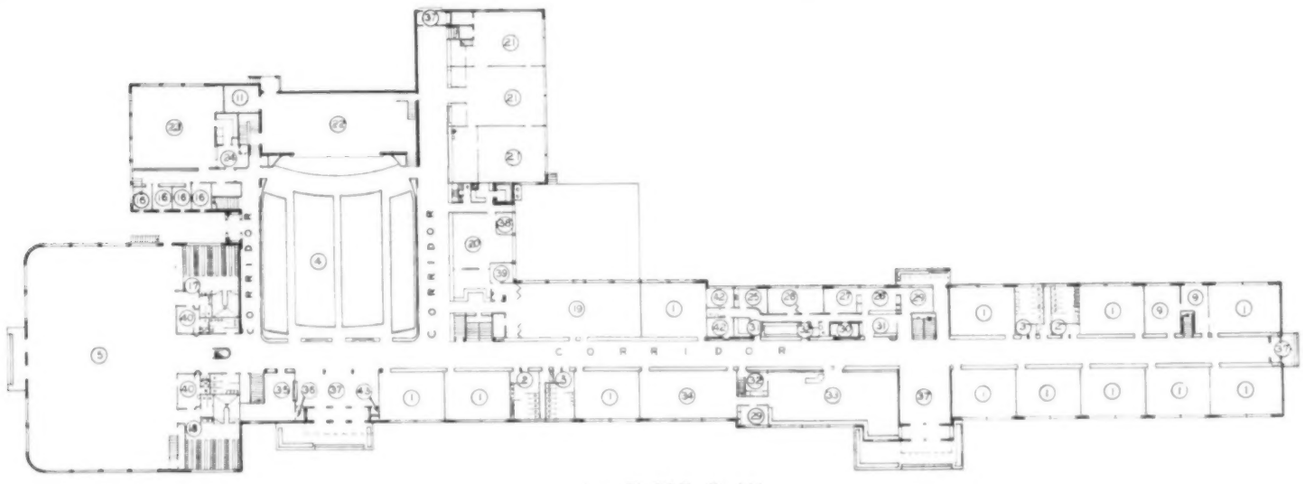
On the first floor, to the right of the auditorium, is a cafeteria which will seat approximately 300, and the kitchen. The serving end of the cafeteria can be cut off from the dining room, which will permit this space to be used for visual education and other meetings of 200 to 300 people. One end of the dining room will have a section of floor which can be raised slightly to serve as a platform.

To the right of the community unit, located on the first floor, is the administrative suite consisting of offices, for the principal, counselors, school nurse, book depository, and vault.

Opposite the administrative suite is to be a large and complete library, seating approximately 100, adjacent to a study hall. There are also rooms for conferences, book repair, and a stock room underneath. The library also is so situated that it may be cut off from the rest of the building and used as a community branch library if and when needed.



2ND FLOOR PLAN



1ST FLOOR PLAN

Floor Plans, Proposed Junior High School, Elkhart, Indiana. — Maurer & Maurer, Architects, South Bend, Indiana.

Legend:
1. Classrooms
2. Boys' Toilets
3. Girls' Toilets
4. Auditorium
5. Gymnasium
6. General Science
7. Crafts
8. Art Room
9. Workrooms
10. Teachers' Restrooms
11. Storage Rooms
12. Food Laboratory
13. Social Rooms
14. Sewing Room
15. Vocal Music Rooms
16. Practice Rooms
17. Boys' Locker Rooms
18. Girls' Locker Rooms
19. Cafeteria and Little Theater
20. Kitchen
21. Industrial Arts
22. Stage
23. Band Room
24. Recording Room
25. Nurse
26. Counselors' Offices
27. Principal's Offices
28. Secretary
29. Conference Room
30. Vault
31. Waiting Rooms
32. Bookstore
33. Library
34. Study Hall
35. Check Room
36. Ticket Office
37. Lobby
38. Dietician's Office
39. Dishwashing
40. Instructors' Offices
41. Balconies
42. Restrooms
43. Telephone Booth

Varied Art Activities

The remainder of the wing on the first floor contains classrooms extending along the long axis of the building.

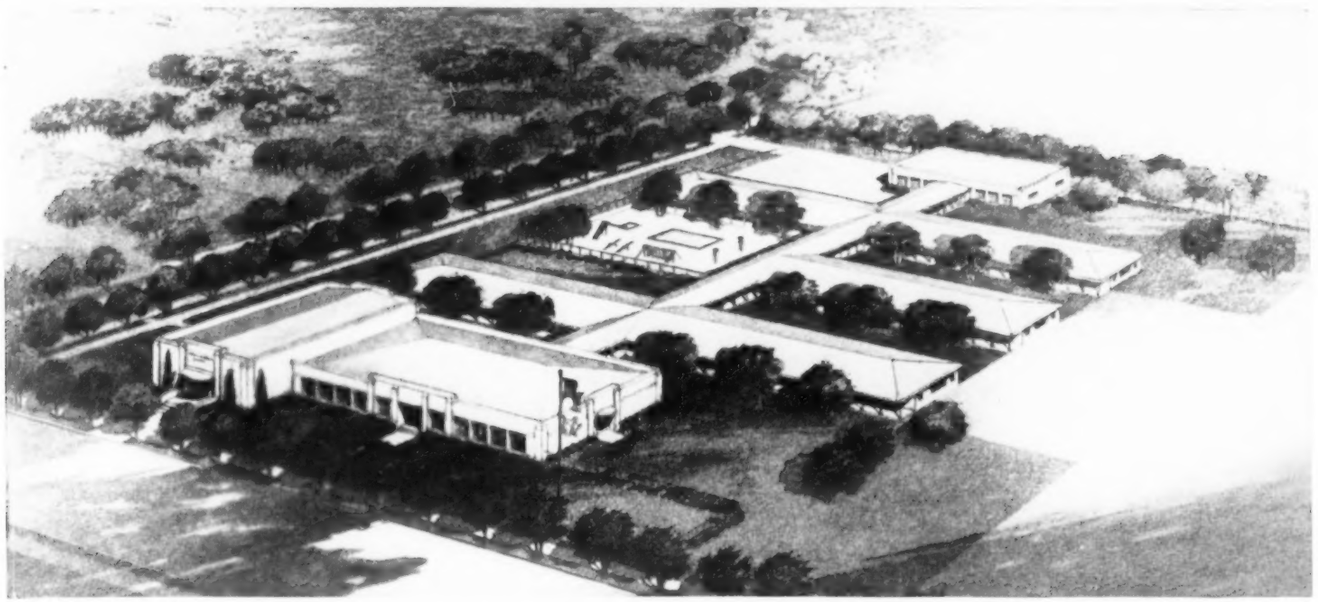
On the second floor, east of the community wing, is the art department, consisting of two rooms, one for craft activities which houses units for leather work, jewelry, plastics, pottery molding, block printing, weaving, and simple woodwork. The room also contains an electric kiln, clay vats, jig saw, and other materials for crafts. This room, designers point out, will have particular appeal for students of artistic bent who have skill and dexterity in manual arts.

The second row is to be equipped for regular art instruction in modeling, illustration, cartooning, designing, portrait, and landscape art. This room, too, can be made available to the public at night and so serve a dual practical purpose for the community.

Widest Use Planned

The remainder of the east wing on the second floor consists of a study hall, classrooms, two modernly equipped science rooms, and rest rooms for men and women.

In planning the new junior high school building, members of the Elkhart school board attempted to make it just as practicable and usable a plant as possible for both students during the day and the public at night. The planning represents the combined thinking of members of the board, members of the staff, the administration, and experienced architects and designers.



Air View of the Henry M. Mingay School, Burbank, California.

New Type of Elementary School for Burbank, California

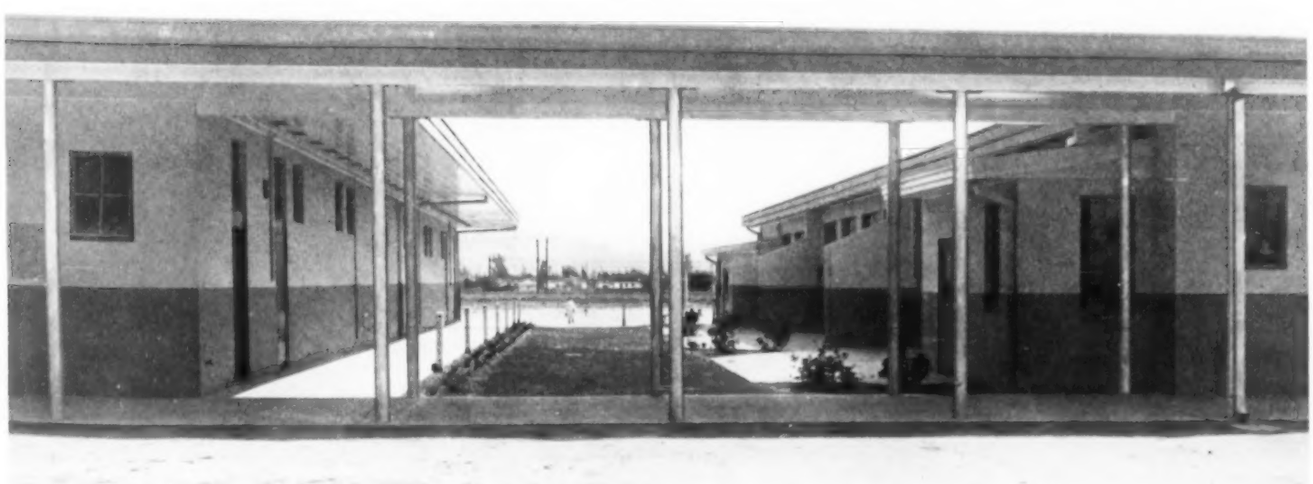
G. H. Schulte[1]

The description of a new school development requires some introductory remarks concerning the various factors which should be considered in its planning, as these factors have some bearing on the successful operation of the school and on its particular function in the school district.

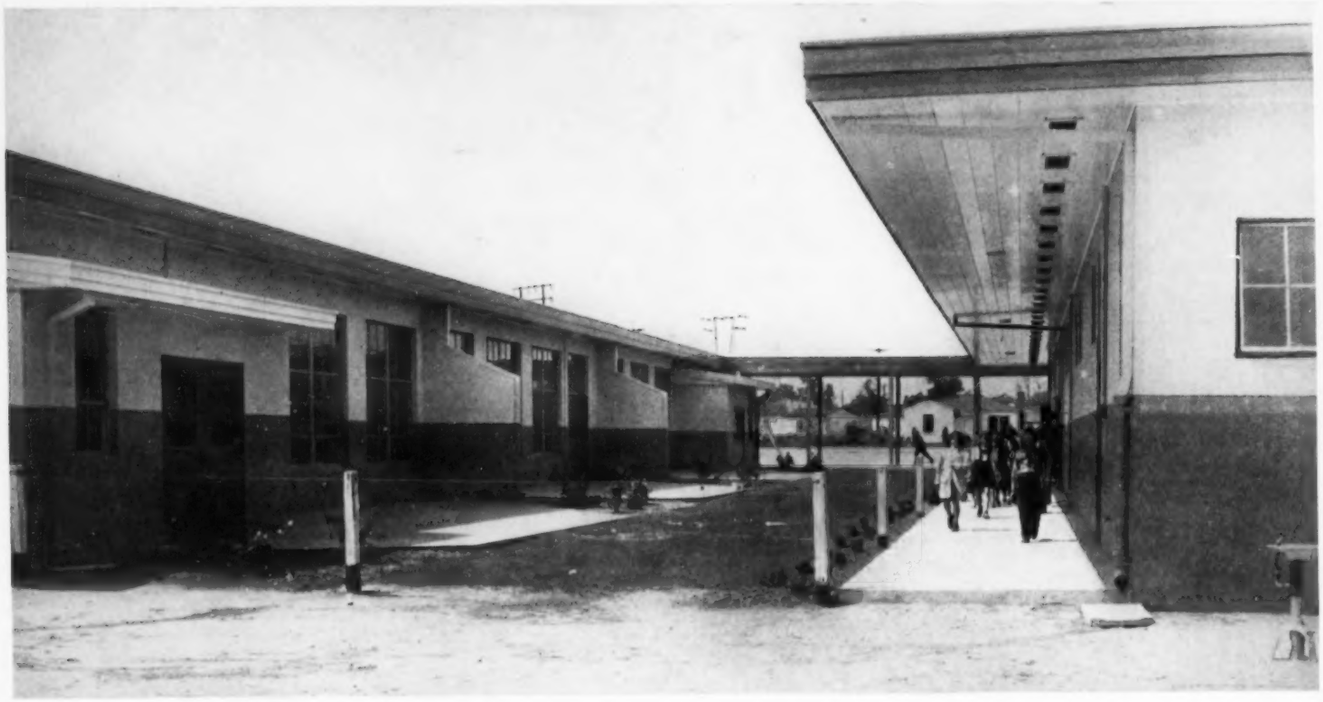
The city of Burbank is located in the San Fernando Valley in the metropolitan district of Los Angeles, in Southern California. The motion picture and airplane industries have caused a rapid growth of the city to the present population of over 60,000, nearly half of the increase having occurred in the past five years. The city birth rate is considerably above that of the county and state. Housing development has lagged behind population increase with school facilities a poor third in the race. Dwellings are nearly all of the bungalow type on standard fifty foot lots.

The entire population is remarkable for its youth — it consists largely of young couples many of whom have children of preschool and primary school age. There are many cases where both parents are employed, and nursery school and child care centers are an increasing part of the school district's function. The young parents are keenly interested in public

[1]Structural Engineer, Burbank Unified School District, Burbank, Calif.



A typical instruction and play court with covered way, Henry M. Mingay School, Burbank, California.



Another view of a typical court and covered way as seen from the playground, Henry M. Mingay School, Burbank, California.

school affairs and are solidly behind the board of education in its effort to build up the quantity and quality of its schools.

Elementary schools in the district have previously been of the conventional type of brick masonry or frame and stucco construction, one and two stories in height, with a central corridor, starting off as plain, rectangular structures, and growing by various sporadic additions as enrollment increased.

It is a well-advertised fact that the climate is particularly adapted for outdoor living and during the school year from September to June there are seldom more than a dozen rainy days to prevent the use of outdoor facilities. The attendance area which this new type of school serves is near the west city limit. A study of school enrollment and facilities has been completed recently by the school district by means of which it is hoped to be able to predict the enrollment and the necessary facilities at any stage of the city's growth. From the data prepared the ultimate capacity of each school can be predicted and planned for in advance, and new schools can be planned in an orderly manner.

The tendency in Southern California has been toward a recognition of its climatic advantages in planning outdoor activities for school children, and outdoor classrooms are increasingly popular. Visits were made to existing schools of this type, and their advantages and disadvantages were discovered by interviewing administrators, teachers, and caretakers. After due consideration, the superintendent's recommendation of the new type was adopted by the board of education, and preliminary drawings were prepared for an elementary school with an ultimate enrollment of six hundred pupils. The school site contains slightly over five acres, which is somewhat smaller than is ideal for a school of this size.

The perspective drawing (Illustration No. 1) shows the proposed ultimate development of the project. In the foreground is the administration building with three classrooms, flanked by an auditorium. Behind them are wings of three classrooms each to the right and left of a covered way which leads from the main building to a library-cafeteria, completing the group. The proposed location of the cafeteria at the edge of the site is to permit the use of a central kitchen to serve both the elementary school and the junior high school adjoining. A separate enclosed playground is shown for the use of the kindergarten pupils.

The administration building is of the ordinary rectangular type with corridors on both central axes. Flanking the main entrance are the offices of the principal, secretary, and school nurse. Nearest the auditorium there is a general-use room with shelving for summer storage of books, and wordrobes and closets for costumes and similar storage. It is to be used for conferences, PTA meetings, and as a dressing room in connection with stage plays. Across the corridor is a teachers' room with kitchenette, which may also be used for serving refreshments at minor social functions. A large storage room, a janitors' room, and three standard classrooms occupy the remainder of the building.

The classroom wings at right angles to the central covered way are a new feature in this school district. They extend almost exactly east and west, so that their main lighting is from the north. They have wide, overhanging eaves which shade the windows from direct sunlight, and no window covering is required except for darkening classrooms during motion picture projection.

There is a space of forty feet between the wings and in these courts or patios there is a cement-paved work space in front of each classroom, with projecting walls and shrubbery separating the paved areas. Along the north side of each patio is a cement walk protected by the overhang of the main roof, and providing access from the covered way to the individual classrooms. Between the walk and the paved areas is lawn.

In the design of the classroom wings no particular thought was given to bilateral lighting, but transoms were provided in the south wall under the roof overhang for cross ventilation. By painting the wood ceiling of the overhang white, it was found that considerable reflected light was admitted through the transoms. In this climate ventilation of the attic space is also necessary, and it is provided by means of screened openings in the ceiling of the overhang, through which air is drawn. The air is exhausted through the screened sides of a continuous monitor at the ridge of the low-pitched roof. The ceiling vents are noticeable in Illustrations No. 2 and No. 3.

Interior arrangement of elementary classrooms has undergone several experimental

stages in the local school district, and the grouping of three classrooms per wing has provided an opportunity to use two arrangements in this school as shown in Illustration No. 4.

All classrooms are 24 feet wide and 40 feet long. Both end rooms in each wing have a projecting entry leading to the outdoor work space. A sink with paint cabinet above is built across one corner, and on the opposite wall there is a recessed wardrobe space. Supply closets are also built into this part of the room, leaving the main portion of the classroom available for continuing projects which are usually in course of construction along the back wall.

The middle room of each wing has a different arrangement, with the sink, wardrobe, and supply closets all built in along the back wall. The wardrobes have entrance and exit doors and are deep enough for pupils to pass through in single file to get their coats, lunches, etc.

Desks have been largely superseded by tables and chairs, and teachers show their individuality in grouping them for the various activities of the modern schoolroom. Every room also has a set of book shelves which are movable and can be placed for easy access to the reading group. A counter at window-sill height, with shelves below, is a useful work and storage space. Illustration No. 5 is a typical interior view.

An administration building and three classroom wings were built in 1945 during the height of war shortages and many substitutions were necessary. Due to the scarcity of lumber, the original design of frame and stucco was changed to concrete. Cement floors were laid on the ground, and all conduit and piping is concealed above the ceiling of the covered way and of the roof overhang. It was possible to secure awning type steel sash for the windows, and exterior doors are metal-covered. Classroom walls are plastered, but the ceilings are of acoustic tile applied directly to plaster board. Floor covering is asphalt tile. Counter tops and sink enclosures are covered with linoleum. Blackboards are of natural slate and tack boards of cork carpet. Above the blackboards and on the back wall are continuous bands of painted fiber board which are used to display posters, paintings, and other work of the pupils. The combination of acoustic tile on ceilings and fiber board on walls produces excellent acoustic results. Noises are absorbed and reverberations reduced so that optimum hearing conditions prevail with full pupil occupancy.

A typical classroom looking toward the teacher's desk. Main windows at left, supplementary windows at right.

The use of easel boards has become standard in the elementary schools of this district, for water color work, finger painting, etc. A wide chalk rail is provided on which the cork-covered easels rest, with clamps in the top secured under the metal blackboard trim to hold them in position. They have proved so successful that it is proposed in the future to replace blackboards on the side walls with permanent easel boards.

With white ceilings, light-cream-colored walls and light green woodwork, these classrooms have proved to be bright and cheerful though no direct sunlight is admitted. The concrete walls are painted on the outside with oil-cement paint of an off-white shade, produced after much experimentation, to provide reflecting value without undue glare. The door frames are light green and the doors themselves are a harmonizing green-blue. A similar blue makes the wide eave boards of the overhanging roof stand out distinctively. To protect the lower portion of the walls from hand and foot prints a slate gray wainscot has been used.

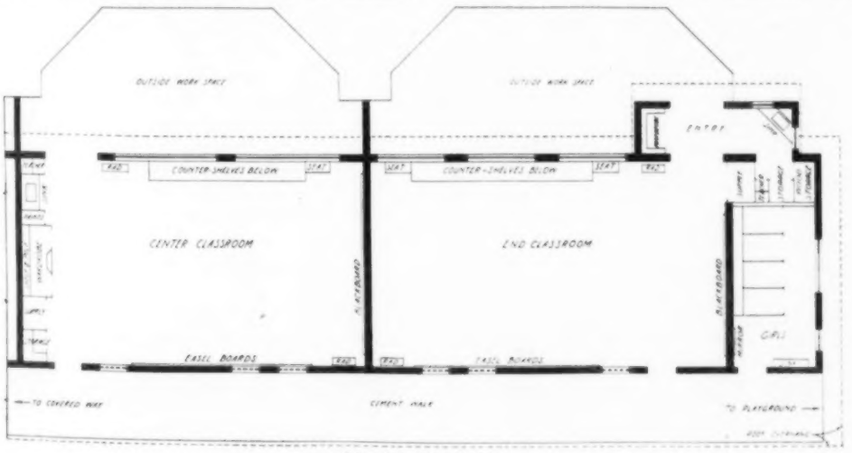
Toilet rooms for boys and girls are placed at the ends of the first and third wings making them easily accessible from classrooms and playgrounds. They have tile floors and wainscot and marble toilet partitions. At the ends of the middle wing are storerooms for janitors' supplies and for tools for playground maintenance.

The playground is paved with asphalt from the ends of the building for a sufficient distance to provide space for the various ball games with court lines marked off on the paving. Two softball diamonds occupy the far corners of the present playground.

This type of school covers an unusual amount of space, but it is felt that its possibilities are also unusual. The arrangement is such that work with carpenter tools can be done by pupils outdoors without damage to the building, and many activities lend themselves equally well to outdoor performance.

There are no windows in the south walls of the classrooms and the attention of pupils is consequently not distracted by the activities of pupils in the patio area. It has been found that a forty foot wide patio with the projecting baffle walls and supplementary shrubbery provides ample privacy and does not interfere with classes in adjacent rooms or in opposite wings.

With proper and well-maintained landscaping this type of school fits unobtrusively into the landscape and promotes the outdoor living which the climate of this area makes possible and desirable.



Plan of Typical Classrooms, Henry M. Mingay School, Burbank, California.

A 1947 View of —

Ventilation Requirements in Schools

*H. H. Linn**

An extensive program of school building planning is under progress throughout the country, which is certain to result in a very substantial building development in the near future. The program, in the aggregate, and over the next ten years, will call for total expenditures running up into the billions of dollars. The present high building costs are focusing attention on the need for scrutinizing proposed projects to eliminate needless expense. In many of our states, statutory requirements or state departmental regulations call for certain costly building provisions that are not based on scientifically proved need, but that rest on assumptions set up many years ago. One such costly provision deals with the subject of ventilation.

Although they are in the minority so far as all 48 states are concerned, there still are a number of states which require that new school buildings must be designed to provide an air supply of 30 cubic feet per minute per pupil which necessitates the use of mechanical equipment. The continued use of this standard requirement of 30 cubic feet per pupil is needless for it originally was based on the false premise that organic poisons as measured by the amount of carbon dioxide in the air of an occupied schoolroom could become toxic unless removed by the introduction of copious quantities of fresh air. This theory, that the essential problem of ventilation was chemical in nature, necessitating a high rate of air change for good ventilation, was so generally accepted by hygienists (and heating and ventilating engineers) up to the turn of the twentieth century that the states of Massachusetts, New Jersey, and New York in 1902, 1903, and 1904 respectively enacted laws making the 30-cubic-foot standard a mandatory requirement for new school buildings of a certain size, or in communities of a certain class. By 1925 there were twenty states that had laws or regulations specifically calling for this air supply standard, and two other states had requirements worded in different language but being essentially the same in effect.

And yet, interestingly enough, during the first quarter of this century when the mechanical ventilating requirements were being made mandatory because of the 30-cubic-foot standard predicated on a false theory, evidence gathered by more recent hygienists and students quite definitely proved the toxic theory to be a myth.

In place of this theory, it was demonstrated that the essential problem of ventilation is physical in nature with two major objectives:

1. Providing comfort for the occupants of a building by removing excess heat given off by the human body at a proper rate, and
2. Maintaining an acceptable odor level.

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Possibly a third objective should be mentioned, the provision of an atmosphere free from objectionable dust, gases, and bacteria. This third objective, however, is closely tied up with objective number 2 — maintaining an acceptable odor level.

Rescind 30 Cubic Feet Requirement

The acceptance of this more modern view of ventilation ought to result in the rescinding of the mandatory requirement of 30 cubic feet of air per person per minute, which calls for mechanical ventilation. (This, however, is not to be interpreted to mean that there is no place for mechanical apparatus in connection with school ventilation.) Yet today there still are many states in which the obsolete 30-cubic-foot standard continues to require the installation of mechanical ventilating equipment in school classrooms, because of existing laws, or departmental recommendations. The situation, however, is better now than it was in 1925 as a number of states since then have modified their ventilation requirements.

Two states in which new school building codes or standards have been issued in recent years have recognized the inappropriateness of the 30-cubic-foot standard and have used other measures for determining ventilation requirements. The Connecticut School Building Code[1] adopted in 1941 stipulates that:

> Ventilating systems shall be figured to provide, and heating systems to allow for, the introduction of fresh outdoor air as follows:
>
> Classrooms, laboratories (exclusive of fumehood), libraries, auditoriums and all rooms where occupancy may be readily estimated (except as noted below):
>
> 15 cu. ft. per min. per person *but* in no case less than 4 air changes per hour.
>
> Toilet rooms, locker and dressing rooms, cloak rooms, kitchens, and food laboratories 6 complete changes per hour.
>
> NOTE: In certain rooms (notably auditoriums) having a positive supply of warmed air, the above requirements may be varied to meet conditions.

The West Virginia Standards for Schoolhouse Construction[2] specify that:

> Air changes shall be provided by ventilating and heating system load calculations as follows:
>
> In regular classrooms a minimum of 10 cubic feet of fresh air per child per minute or five air changes for each 2-hour period.
>
> In all rooms where gases and odors, either injurious or annoying, are liberated by operations performed therein, and in toilet rooms and motion picture booths, as suggested in 3 below, positive ventilation of at least six air changes per hour is recommended during such times as these operations are being carried on.

New Requirements in New York

New York State amended its former law requiring the 30-cubic-foot standard, and since April 13, 1940, has had the following general statutory provision: "The Commissioner of Education shall not approve the plans for the erection of any school building or addition thereto or remodeling thereof unless the same shall provide facilities for heating and ventilation adequate to maintain healthful and comfortable conditions in the classrooms and study halls." This law has been supplemented by the Commissioner's regulations on heating and ventilation approved by the Board of Regents November 16, 1945, which refer to the air supply in the following language:

> 1. In classrooms, provision for air change shall be made which, in the judgment of the Department, will provide a minimum air change of 10 cubic feet per minute per occupant. For effective thermal operation in mild weather a design of 15 cfm. is desirable.
>
> 2. In rooms planned for close assembly a minimum air change of 10 cfm. per occupant shall be provided in order to remove odors. Additional air change, depending largely upon wall exposure, may be required for effective thermal operation in mild weather.
>
> 3. In rooms where there is danger of toxic substances occurring in large concentrations, or where odors are likely to be strong, or where overheating is likely to occur, special ventilating equipment adequate to relieve the situation and entirely independent of the ventilating system serving the rest of the building, shall be installed.

The significance of the new ventilation demands of the three states just referred to lies in the fact that the fresh air supply for classrooms in general is deemed adequate if it provides 10 to 15 cubic feet of air per person per minute — an amount that can be provided by window ventilation without the use of elaborate mechanical equipment. The smaller fresh air supply also reduces the heating plant requirements and subsequent operating expense. Proper temperature levels of course are associated with the air supply requirements as also are such factors as air movement and relative humidity. The relative humidity factor, however, generally has to be ignored in the school during the heating season so far as any practical control over it is concerned. But this generally is not serious since the importance of relative humidity as a factor in the thermal comfort of pupils is not very great under the usual school classroom conditions in the wintertime.

Mechanical Ventilation Problem

The writer does not propose to enter into a discussion of all the physiological factors inherent in proper ventilation (and heating), or of the highly technical aspects of physical plant specifications required to attain acceptable ventilation standards, but rather to call attention to some of the questions confronting the school administrators and

[1] Connecticut State Department of Education, *School Building Code*, p. 67.

[2] West Virginia Council on Schoolhouse Construction, *Standards for Schoolhouse Construction*, p. 56.

architects contemplating new building construction. It is assumed, of course, that there is general acceptance of the fact that ventilation is essential in a school building — that some fresh air must be brought in and that vitiated air must be removed. A basic question is, how shall this be accomplished? There is no single answer to cover all cases because of many different factors. The local climate for instance may be a dominant determinant. In at least a few states, statutes or departmental regulations will influence decisions. Then there are such factors as size of group per room, the effect of solar heat, the type of building construction, the type of activity to be carried on within an area, and even the socio-economic status of the pupils to be housed. The need or desire for economy in construction also may prove to be a strong factor.

During the period when opinion (and state requirements) supported the view that proper ventilation in schools could be attained only by the introduction of at least 30 cubic feet of fresh air per minute per pupil, the use of some type of mechanical equipment was virtually a "must," and particularly in the northern states where such a volume of fresh air could not be admitted through windows alone without causing cooling drafts. In cold weather, this fresh air had to be tempered by passing over furnaces, or through plenum chambers heated by steam or hot water radiators before being sent into the rooms. This involved modifications of the heating plant, fan installations, and a system of distributing ducts. An all blast heating and ventilating system would both heat and ventilate a classroom from a central point with no supplementary source of heat in the individual classroom. A split system would have fan ventilation combined with direct radiation in the several classrooms. These centralized ventilation arrangements did not always operate properly because of poor design or improper adjustment, and at times were thrown out of kilter because individual teachers opened classroom windows or doors. The latter weakness was offset in part when the unit ventilator was developed, for then at least one teacher would not disturb an entire ventilating scheme. But the unit ventilators were not always satisfactory either — some being noisy, and others creating draft conditions, especially if some part of the apparatus failed to function properly.

An Inoperative Requirement

The result was that many schools throughout the country equipped with mechanical ventilating apparatus ceased their operation if the heating provisions otherwise were adequate, and then resorted to windows for fresh air. As long ago as 1924, McLure[3] reported that 49 per cent of the school buildings constructed between 1918 and 1924 in which fans were installed, were not operating them. The percentage of nonoperated mechanical ventilating systems in all probability is considerably higher today, since the 30 cubic feet per minute standard is acknowledged to be unreasonable as a minimum requirement, and several states have modified their former ventilation standards. However, the statutory 30-cubic-foot standard never did guarantee that the mechanical equipment would be operated. It did serve to make such installation mandatory, but the writer does not know of a single instance where a local school has been called to account by any state authority for its failure to operate the mechanical ventilating system. The writer has visited scores of school buildings in states where the 30-cubic-foot standard still exists, and has found many of them with inoperative mechanical ventilating systems. If these costly systems are not to be operated after being installed, one may well ask the question as to why they should be installed in the first place.

Many schools, and some of substantial size, have been constructed without elaborate mechanical ventilating provisions for classrooms. Note that this statement refers to *classrooms*. Auditoriums or assembly halls where large groups of people meet may require special ventilating provisions even though the classrooms do not. Other areas such as toilet rooms, kitchens, and special shops also have ventilation needs different from those of the customary classroom.

Window Ventilation

Window ventilation may be quite acceptable for classrooms in some localities. However, in regions where considerable heating must be provided during the winter season if the window ventilation is to be successful, all windows should be equipped with deflectors and should have shielded radiators installed beneath them to permit the tempering of air and the avoidance of cooling drafts. There also must be adequate duct outlets near the ceiling on the opposite side of the room to carry away vitiated air. One trouble with this plan, however, lies in the fact that its success in operation depends in large part on the classroom teacher who is notoriously negligent about the proper care and operation of both ventilating and heating systems. Her attention to these features too often is based on her personal comfort. She may want windows open or closed, not because of pupils' needs but because of her own sense of comfort. More often than not, her personal preference is for a *warm* room, a condition that may actually require more ventilation in order to remove excess heat. If the temperature does seem excessive to her, she may want to open a window widely in order to effect a quick cooling. This may cause an undesirable draft condition which she personally can escape by the selection of a window more remote from her station. But it may happen to affect a number of her pupils. It may be argued that teachers should be instructed how to care for their ventilation and heating requirements, but even with such instruction they often fail to carry out the suggestions. A classroom teacher generally does not note the slow change occurring in the temperature and odor levels in her room until an extreme point has been reached. The writer does not have much confidence in the ability of the average teacher to personally regulate the heating and ventilating needs within reasonably narrow limits even with instruction, and she is definitely handicapped if the physical facilities are not properly arranged, that is, if some windows have no deflectors, or if the radiation is unevenly distributed, or if exhaust arrangements are improperly placed, or possibly blocked.

In theory, it should be possible to properly ventilate school classrooms with a window gravity system without the use of expensive mechanical equipment, or with the use of some modified mechanical exhaust provisions. In actual practice there are tens of thousands of classrooms that depend almost entirely on windows for their fresh air supply and apparently with satisfactory results.

The odor situation is less of a problem now than it was years ago. With smaller classes and fewer children in a room there is less need for total fresh air volume. More homes have learned higher standards of personal cleanliness. Clothing habits have changed, along with laundry standards. But the women teachers also have different views about dress and today their customary light weight and abbreviated clothing requires an increase in the classroom temperature level if she is to enjoy a feeling of comfort. As a rule, the higher the temperature level in a classroom, the greater the need for ventilation.

The New York Studies

The work of the New York Commission on Ventilation has thrown a great deal of light on the general subject of school ventilation. The final report[4] of this commission issued in 1931 summarized its general conclusions as follows:

1. The major objective of schoolroom ventilation is the provision of such atmospheric conditions as will facilitate the elimination of heat from the body surface without the production of objectionable drafts. In practice, this means the maintenance of a room temperature of 68° to 70° F. with moderate air movement. Under such conditions special control of humidity is not essential except perhaps in certain northern regions where humidity is exceedingly low in cold weather. A minor objective should be the provision of sufficient air change to avoid unpleasant body odors.
2. The avoidance of overheating is of primary and fundamental importance for the promotion of comfort and efficiency and the maintenance of resistance against disease.
3. Desirable conditions may be obtained by at least three methods of ventilation when proper design and operation is provided: (*a*) by plenum ventilation; (*b*) by local unit ventilation; (*c*) by window-gravity ventilation. For the average school, favorably located, window-gravity ventilation seems to be the method of choice on grounds of comfort and of economy.
4. Further investigations, in regard to the physiological effects of radiation and convection of heat, of vertical variation in temperature, and of electrical and other properties of the atmosphere, are greatly to be desired.
5. The present laws and regulations requiring a

[3]McLure, J. R. *Ventilation of School Building*, S. S. Little & Ives Co., New York, 1924.

[4]Winslow, C. E. A., and others. *School Ventilation, Principles and Practices*, Bureau of Publications, Teachers College, Columbia University, New York, 1931.

supply of thirty cubic feet of air per pupil per minute in the classroom have no justification in theory; and, in practice, may involve, a serious handicap to progress in the art of school ventilation.

6. Such regulations should be replaced by laws outlining the major objectives of schoolroom ventilation and delegating to some small expert official body the power to determine whether specific plans for school ventilation are adequate to attain those objectives.

More recently (in 1944 and 1945) the New York State Education Department assisted by a special outside committee, and employing as consultants Dr. C. E. A. Winslow and Philip E. Nelbach of the Yale University School of Medicine, prepared a special report[5] on heating and ventilation from which the Commissioner's (of Education) Regulations on Heating and Ventilation were drawn. This report which is now published starts out by discussing the physiological and psychological objectives involved in providing a satisfactory thermal and atmospheric environment, followed by recommendations relating to performance standards. The next section points out methods of attainment and discusses five types of heating and ventilating systems for classrooms.

1. Direct heating with window air supply and gravity exhaust
2. Direct heating with window air supply and duct exhaust with central fans
3. Direct heating with forced unit ventilator air supply and corridor gravity exhaust
4. Forced warm air with central or zone fans
5. Panel heating with window air supply and duct exhaust by gravity or central fans.

No recommendations are made to indicate a preference for any one system over the others, although some special advantages or disadvantages under certain conditions are noted, for the State Department of Education is more interested in performance standards than in physical plant specifications. Architects, engineers, and school officials in New York now have an unusual opportunity to experiment in this field, and after a few years we ought to have more examples of acceptable ventilating schemes of both window and mechanical types.

Reasons for Mechanical Failures

It may be argued that the failure of the mechanical ventilating systems already has been demonstrated by the fact that so many of them have been shut off, with window ventilation substituted. But such argument is fallacious. The substitution of the window ventilation in place of the mechanical system in many (if not most) of the cases that are now inoperative generally has not been based on any local study of the relative values of window versus mechanical ventilation. Rather, the shutting down of mechanical systems has been due to other considerations, of which economy has been one. School custodians have been urged to reduce fuel and electricity costs in some instances and have stopped operating the fan motors as one means of doing so. In other cases the systems have gotten out of adjustment and have not been repaired. It is also possible that some custodians have wished to eliminate some of their work and responsibility and have ceased to operate the ventilating equipment for that reason. In some cases where back drafts have developed in exhaust ducts, the outlet grilles have been closed up with sheets of wood, metal or cardboard so as to interfere with the successful operation of the system. School principals too often know little or nothing about ventilating methods and therefore accept for granted the peculiar local situation. In other words, the writer is saying that many mechanical ventilating systems have been discontinued or thrown out of adjustment because some custodians, principals, and teachers simply haven't understood the importance of this particular phase of their responsibility and haven't really known what they ought to do.

On the other hand, it is a fact that mechanical systems at times have been improperly designed and installed so that they have not been successful, and then they have represented needless cost when thrown out of service. The classroom teacher is justified in objecting to a noisy unit ventilator, or to uncomfortable draft conditions. But drafts may occur with either window or mechanical ventilation under certain conditions.

Advantages of Unit Ventilators

One argument advanced in favor of the window-gravity system is the alleged original low cost of installation as compared with a mechanical system. On the face of it, it would appear that any type of mechanical ventilation would have to cost more money for the original installation. But some of this assumed saving would be taken up if an electric fan unit were installed in the exhaust duct to facilitate air movement. In some localities this might be important since shifting winds might operate against the success of the more simple window gravity system. In northern regions, it is possible that the heavy radiation requirement under every window involved in a window gravity system would offset in part the cost of the mechanical apparatus. There is one further point that may have even greater significance from the standpoint of subsequent operating cost. A properly designed and installed mechanical ventilating system, and especially one designed to permit recirculation of air, can help to heat up a school building faster on a cold morning than an ordinary heating system. This may result in a saving of man-hours for the custodian. In the future when men will expect extra pay for overtime service, this saving of time in the heating period may be of some consequence from the standpoint of long term economy.

If it is determined that a mechanical ventilating system is to be installed in a new building, it may be found that the unit type of ventilator in each classroom will be more successful than the central system, from the operation standpoint. At least, each classroom becomes a unit, and one teacher's desires and practices will not interfere with other classrooms. But there may be some localities where outside noises, fumes, gases or dusts can be better controlled through the installation of the central type of ventilating system.

The issue of window versus mechanical ventilation in school classrooms is still in the debatable stage, with arguments pro and con. From the standpoint of health (so far as respiratory disease incidence is concerned) either plan should be acceptable if properly designed, installed, and operated. Perhaps the same can be said for the maintenance of comfort and for the removal of odors. Original cost of installation probably favors the window-gravity system, but subsequent operation costs probably serve to make the mechanical system a good investment in northern states. A mechanical system has to be kept in good repair if it is to be serviceable, but the window plan must be operated by a person who knows what ought to be done and then does it. So far as the final results are concerned, a forgetful or careless teacher is of no more value in controlling ventilation in a schoolroom than a defective thermostat. The teacher can be reminded but the thermostat can be repaired.

On the basis of the pros and cons just advanced, it would appear that it is almost a toss-up as to whether a new building should be planned on the basis of window or mechanical ventilation for classrooms. Small buildings, or classrooms with small groups of pupils may have less need for mechanical ventilation than large buildings, or large classroom groups. For larger buildings with classes of 30 or more pupils, the writer is inclined to favor the unit mechanical type of ventilation in regions where the winters are fairly severe so that the heating problem becomes a concern. The ability to speed up heating in the mornings by recirculating air is accorded considerable weight. If the original installation and subsequent maintenance costs then can be justified on the basis of subsequent operating economies, the more positive control over ventilation effected by the mechanical system would be a gain. The fact that many existing unit ventilators are noisy or create drafts, or otherwise are not operating properly should not condemn this type of apparatus for all time. New units are much superior to the older types, and with proper installation and operation they can give good results.

[5]Division of School Buildings and Grounds, *Heating and Ventilating Recommendations for New York State Schools*, The University of the State of New York Press, Albany, 1946.

Planning an Efficient Graphic Arts Department

John A. Backus[1]

The well-planned and attractive schoolroom, and its correct functional location in relation to other rooms in the building, are important factors in the operating efficiency of the educational program. American industry is spending millions of dollars in an effort to increase operating efficiency by reducing or eliminating those factors that produce fatigue and destroy morale. In the same way, by eliminating from school building plans the factors which result in teacher fatigue and pupil unrest, we can increase educational efficiency.

A critical survey of many school buildings will show a real need for a better understanding of the functional operations of the individual room and its activity relationship to other instructional rooms. This functional relationship between educational units should influence the correct grouping and location of rooms in the over-all building floor plans. For example, all departments in the school use the school library, and therefore this room should be centrally located so that it will be equally accessible to all and thus reduce to a minimum the loss of time spent in corridor travel. The mathematics and mechanical drawing departments belong in close proximity. The printing or graphic arts department should be located close to the English and art rooms because English and art are fundamental factors in the production of printing projects. In other words, English and art are given purposeful creative values in their application to the work in the printing department.

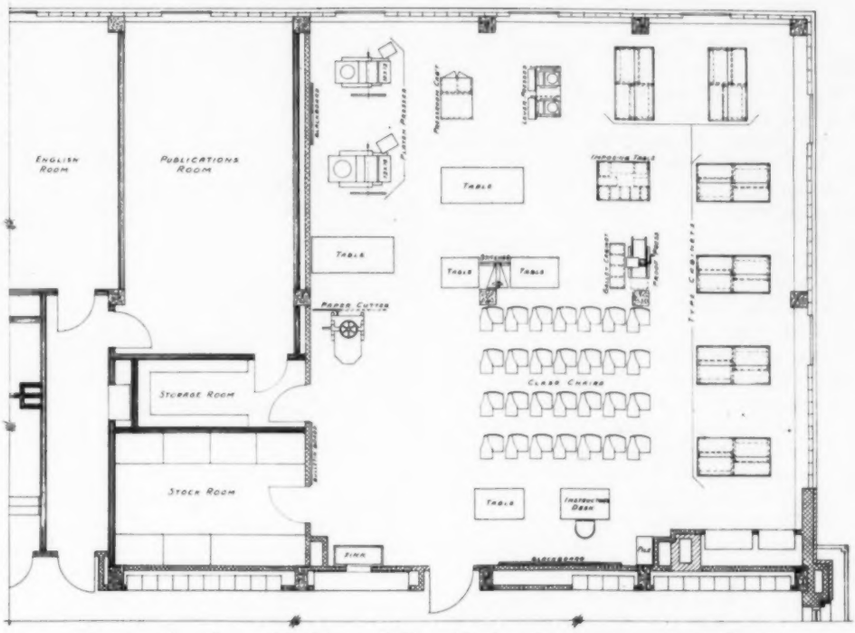


Fig. 1. Plan for a 25–30 pupil Graphic Arts Department for a Senior High School showing correct application of safety, natural lighting, and efficient routing of work.

Other factors that reduce educational efficiency can be eliminated by the intelligent application of our present-day knowledge of human reactions to air conditioning, color dynamics, proper illumination, and organization efficiency. With the present trend toward the all-year-'round use of school buildings, we should give real consideration to the problems of insulation and air conditioning, proper illumination, and noise control.

The number of accidents caused by muscular fatigue may be reduced by the installation of a resilient type of floor material. This deserves consideration, especially for laboratory and shop rooms where pupils are constantly moving about the room and where machinery is in motion as is the case in the printing department.

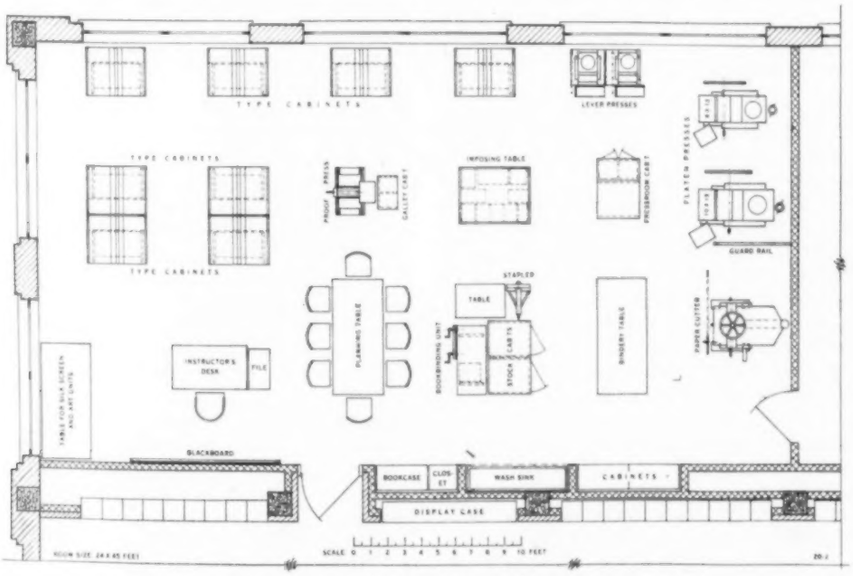


Fig. 2. Arrangement of a 20–25 pupil Graphic Arts Unit in a Junior High School.

Planning the Room Layouts

In general, school board members and architects are giving due consideration to many of the above factors as they relate to the problems of building construction. Too little consideration is being given to the correct planning or room layout that will provide a maximum efficiency in functional operation. We still find new junior and senior high school buildings being constructed with all the shops or laboratories grouped together out in a wing of the building. These shops, on the industrial-arts level, are laboratories in which the so-called academic subjects are given purpose-

[1]Manager of the Education Department, American Type Founders Company, Elizabeth, N. J.

ful application in a well-organized activity, and therefore they should be located throughout the building in their functional relation to other subjects. A beautiful-to-look-at, well-constructed, but poorly planned school building is a real handicap to educational efficiency.

The initial procedure in planning a new school building begins with the members of the board of education who decide on the need for such a building. They approve a general outline prepared by the superintendent, listing the number and types of rooms needed. In due time they employ an architect to translate the educational plans into building drawings and specifications. In submitting their recommendations to the architect, they specify, among other things, the number of pupils to be accommodated in each room or department.

With this information the architect prepares his plans, but before starting on the drawings he must know how many square feet of floor space will be required for each type of room. For example, there will be a certain number of standard classrooms, also certain laboratories and shops. The floor space required for each type of laboratory differs according to the particular activity in question, and this in turn is influenced by the type of school under consideration — junior high, senior high, or vocational school, as well as the number of pupils to be accommodated at a time in each activity.

In the past, this limited information seemed to be about all that was needed by the architect to prepare an over-all floor plan, including all rooms and departments, without any particular consideration of the relationship of one subject to another. Today, the modern school must be planned so that each room or department is individually designed with complete layout of equipment to meet its specified function, and each room or department is located in the building in its functional relationship to other closely related subject rooms. This type of functional planning for each individual room, as well as its relative location to other rooms, makes for closer integration of organization which in turn spells educational economy and efficiency.

Having obtained this over-all information, the architect needs certain definite data about each individual room — its function, size of class, number of square feet required per pupil, equipment to be installed, power outlets, floor load, and other factors that will influence its construction and design. Much of this information can be obtained from school equipment manufacturers.

Planning a Graphic Arts Room

For example, let us consider the printing or graphic arts department in the junior high school. In this department, the pupils will be actively employed in the study of English, art, arithmetic, etc., as these subjects are applied in the production of graphic arts projects. Therefore, the function of this room is general consumer education through a program of well-organized, purposeful graphic arts activity. Consequently, the equipment will not include heavy production machinery such as one would expect to find in a vocational training center where the objective would be the development of trade skills. This type of functional information will have a certain influence not only in locating the room in the over-all plan but also in the specific design and layout of the floor space.

In the preparation of a floor plan, whether it be for a graphic arts unit in a junior, senior, or vocational high school, there are certain fundamental factors to be considered. These factors are:

First, the routing of the material in the room. There exists a certain definite functional relationship between each item of equipment in the print shop, which determines its correct location and thus makes for efficiency in class organization and operation. This type of room layout will eliminate unnecessary travel and confusion and, incidentally, influence discipline through efficient organization.

Second, the natural lighting of the room. As far as possible, all equipment should be so located that the light from the windows will enter at the side of each pupil. In other words, the operator should not be facing the light and he should not be working in his own shadow.

Third, the safety problem. All machinery should be completely equipped with safety devices and should be so placed that the student or operator is not standing in a thoroughfare aisle where traffic may interfere with his work. The operator of a hand-fed press should not face the glaring light of a window. If the room is

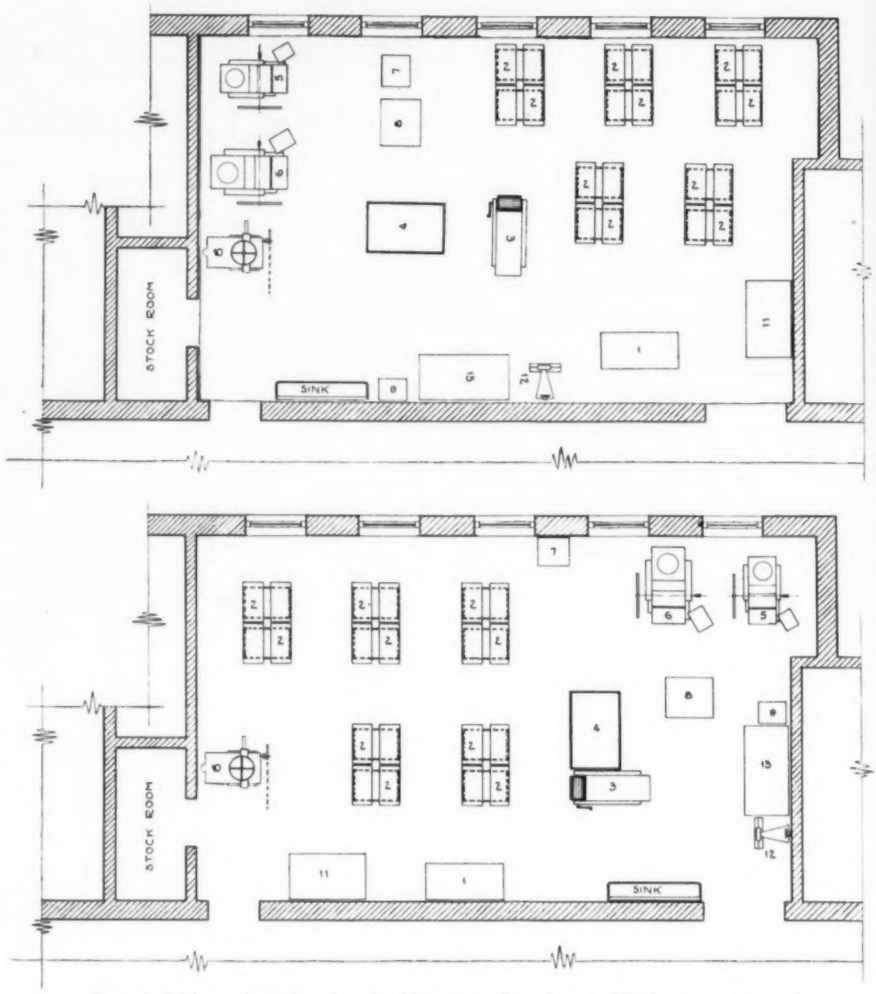


Fig. 3 (below) Poorly planned layout, showing inefficient routing of work and bad lighting arrangement. Fig. 4 (above) Equipment shown in Fig. 3 re-arranged functionally to increase operating efficiency and safety.

Legend:

1. Instructor's Desk
2. Type Cabinets
3. Proof Press
4. Imposing Table
5. 10 x 15 Platen Press
6. 12 x 18 Platen Press
7. Hand Lever Press
8. Drying Rack
9. Ink and Roller Cabinet
10. Paper Cutter
11. Table
12. Stitcher
13. Bindery Table

Pupils in Graphic Arts Department of Essex County Boys Vocational School, Newark, New Jersey, setting type at cabinets correctly located for natural lighting of work.

located on the first floor of the school, the lower half of the windows should be set in a ground glass so that the pupils will not be distracted by outside happenings.

A Comprehensive High School Plan

Illustration I represents the floor plan of a senior high school graphic arts department and is an excellent example of the application of these three fundamental factors. The type cabinets are so located that the light falls on the side of the pupils who are working at the case. The pupils feeding the presses are not in a thoroughfare aisle and the light is at their side. Note the natural routing of the material — the paper stock from the stock room to the cutter to the presses. Also, the type composition from the type cabinets to the proof press, to the imposing table, and on to the presses. The stock room is so placed that paper stock may be brought into the room and put in storage without interfering in any way with the class. This layout will accommodate 26 to 30 pupils at a time. Provision is made in this room for group meetings. An adjoining room serves as a reference room in which "copy" is prepared for the school publications, and adjacent to this is an English room.

Many school plans call for a standard width of room construction and, when this is the case, the needed floor space to accommodate a certain number of pupils will be determined by the length of room. For example, in a junior high school graphic arts program, 55 square feet per pupil is recommended. If the standard width of room is 24 feet, a class of 20 pupils in the graphic arts activity will require a room 45 feet long.

On the senior high school level, where the equipment is a little more advanced over that in the junior high school, 63 square feet per pupil is recommended. If the standard width of room is 26 feet, a class of 20 senior high school students will require a room 48 feet long. Illustration 2 is an ideal floor plan for a 20- to 25-pupil unit, requiring a 24 by 45-foot room in a junior high school. Note the arrangement of each item of equipment, which makes for efficiency and safety in operation.[2]

With this information the architect will locate the necessary electrical outlets and built-in wall cabinets, and the school officials will have room layouts embodying all factors leading to educational efficiency in operation.

Efficient Room Layouts in Old Buildings

Up to this point we have dealt exclusively with the question of operating efficiency as it is related to new school plans. What can be done to embody these factors in buildings now in operation? It may be too costly to relocate the rooms in a building on the basis of functional relationship. However, a study of each room can be made, leading to a rearrangement of certain items of equipment that will lead to greater operating efficiency. Illustration 3 is a good example of an inefficient, poorly planned floor layout. In other words, this illustrates the way it *should not* be done.

Note that in this layout the two hand-fed presses are placed so that the operators are facing directly into the light from the windows. These presses should be turned around so that the light will enter at the side of the pupils who operate them. Furthermore, note that these presses are located at the extreme end of the room, while diagonally across, at the other extreme end, are found the stock room and the cutter. This means that the paper stock is taken from the stock room, cut on the paper cutter, and then carried to the other extreme end of the room for printing on the presses. A correct floor plan would show these two presses (5 and 6) located at the other end of the room beside the paper cutter (10). A satisfactory rearrangement is shown in Illustration 4. This would necessitate relocating other items, such as the bindery equipment, to provide for natural routing of the printed material, thus increasing the operating efficiency. Even this corrected plan indicates an overcrowded condition.

In conclusion, our present-day concept of education for life and citizenship in an industrial civilization has given us a greatly expanded curriculum in which more and more emphasis is placed on the development of creative thinking and doing. This in turn calls for a new concept in school building design, because educational efficiency in the administration of our modern schools is greatly influenced by, and I might say begins with, the organization of the school plant. The plans of the modern school will give due consideration to the educational functions of each room and the correct location and grouping of certain rooms in which the subjects and activities are closely related.

[2]Floor plans such as these, for different sizes of classes in junior, senior, and vocational schools, are available on request from the Department of Education, American Type Founders, Elizabeth, N. J.

PROPERTY MANAGEMENT POLICIES

The board of education at Cincinnati, Ohio, has acquired a number of properties for future use as school sites. The homes and commercial buildings on these properties are being rented. As a guide for its executive officers, the board has adopted six general principles to guide in the architectural management and maintenance of these properties.

1. In so far as possible, the responsibility for minor repairs and other maintenance work shall be placed upon the tenant.
2. Maintenance work on a given property shall be done only as needed to keep the property reasonably tenable for its contemplated remaining period of use, and shall not exceed in cost the anticipated rental income for said remaining period of use.
3. Except in emergencies maintenance work shall be done by regular employees of the board only in so far as their assignment to such work will not interfere unduly with the performance of their duties. In other instances, private contractors shall be employed.
4. The rentals shall be consistent with those charged for similar properties in the same neighborhood, subject to reasonable allowance for repairs and maintenance work done by tenants.
5. All costs in connection with the rental, management, and maintenance of these properties shall be paid from the income from rentals.
6. The approval of the board shall be secured in case it becomes necessary to employ additional personnel or to secure the services of a private real estate management firm in the discharge of the responsibilities delegated to the superintendent of schools.

The Safety Factor in School Building Planning

H. W. Schmidt[1]

"I hardly see how you can feel that the matter of safety, as a factor in school planning and design, is in need of more attention by all concerned when we have building codes, both local and state-wide, which certainly govern in such instances — and one does pay attention to these factors. Besides, the designer is or at least should be thoroughly familiar with those features which promote safety," said a prominent school administrator who was in the "throes" of a 1946 school building program. We had been examining a set of plans and specifications for a new schoolhouse to be erected in his town.

"True enough, so far as it goes," I said, "when codes are mandatory certain features of planning having to do with safety must be complied with, but even here the minimum may not suffice, arrangement may require modifications and even specifications are not completely immune to suggestions and criticisms. Where codes are suggestive such as the Exits Code of the National Fire Protection Association, the suggestions of the Fire Underwriters and numerous others, one is likely to slip a little on the basis of cost or expediency or some other reason, and there it is that the factor of safety is apt to be minimized.

"I don't mean the matter of safety construction, the size and weight of steel, the thickness of walls, the size of footings and columns, and many other features which are usually properly designed. But there are many other things which are not so self-evident and which give a good deal of latitude to the designer, which of course is right and proper. By the same token we are inclined to forget the safety measures, which are often not too obvious, and devote our talents in more appealing directions."

My friend agreed to this thesis and in consequence we went over his material with the proverbial fine comb; the following paragraphs are, in a great measure, the result of the plan analysis with the safety factors basic.

Safety an Inclusive Term

"But what do you include in the term *safety?* I thought the term simply meant to plan so that persons did not get hurt in the building. But you are talking about things which we — at least I — do not include in our thinking about safety," was one of the first comments which my superintendent friend made when the discussion began.

"What I include are all matters which may affect the pupil of a school adversely so far as his body and his health are concerned: injury and accident prone constructions, and maintenance, heating, ventilation, lighting, sanitary hazards, and many others whose connection may be rather tenuous but nevertheless should be borne in mind. And I may even go so far as to state that the removal of many hazards, especially those to health, have a definite influence upon the educative process, the mind. Am I going too far?" was my reply.

"W-e-l-l, I don't know, as I never thought about that, much at least; maybe that viewpoint has a lot for it, but that means a different kind of plan study than I had in mind. But I suppose we had better buckle down to it and see how far *this* school building will conform to all the features you have in mind," he replied. And buckle down we did.

Throwing the whole matter together and putting down the different elements discussed, the following represents the nub of this paper, partly based upon the specific plan mentioned and in part on some abstractions.

In general the hazards encountered may roughly be grouped into five categories, those of fire, mechanical, electrical, health, and maintenance; of course the division is not rigid and the dangers overlap.

The Fire Hazard

The fire hazard is the most spectacular, and school fires occur at a rate which is quite alarming. The National Fire Protection Association estimates that there were more than 35,000 school fires since 1930 and the specific record covers over 1000 cases. Fortunately the loss of life is not so great as in other forms of accidents and the fires reported occur mostly in the older buildings; on the other hand the modern school buildings are by no means immune, though they are supposed to be "fireproof."

And by the way, the term is rather misleading as no building is completely fireproof; the term fire-resisting seems more appropriate and now is used commonly because even buildings which have a high fire-resisting rating still contain combustible materials, including trim, floors, furniture, books, supplies, etc.

Of great importance are the design and arrangement of stair wells or shafts; they can be arranged so as to minimize the spread of flames and smoke and gases from floor to floor. The latter two effects of fire are about as dangerous as the flames themselves, *vide* the La Salle Hotel and other fires. Materials of construction should have at least a four-hour rating for this part of the construction. Must one state that the hallways leading to the stairs should be enclosed by fire walls?

Of course there should be at least two stairways, remote from each other, from each floor; and it seems common practice and good sense to limit the number of classrooms served by each stairs. If not specified by code, the practice seems to be to limit this number to four, with stairway widths in accordance.

Too often we find two stairways leading to a common landing, especially in older school buildings, but this bad situation has been observed in comparatively modern schools as well. The fire escape has no place on a modern building and has been quite universally accepted as indicating improper planning. (This feature was observed on the plan basic to this article.) On old buildings it may be necessary to install outdoor escapes — but the criticism still holds. Even on buildings of the unit type where additions are to be made in the future, the proper stairways should be provided.

Exit doors should lead directly to the outside, street, or sidewalks. (Here again we found one of the stairs discharging into a lobby from the auditorium.) All such doors should of course be provided with antipanic hardware and shatterproof glass, and should swing out. (The specifications covering this item were indefinite and permitted a flimsy type of hardware.)

Most buildings contain areas and rooms which exhibit inherent fire hazards, such as laboratories, shops, cooking laboratories, repair shops, etc. Common practice in the larger schools is to segregate the various shops and plan for them in areas isolated from the main structure.

Heater rooms and coal bunkers should not be located in the main building itself; they belong "outside" and should be separated from the latter by automatic fire doors. (Here again we found this principle violated.) The use of oil for fuel obviates the bunker but calls for other safeguards.

Then we have the "storage rooms" to deal with. That term covers a lot of territory and occasions many sins. Usually they serve for the storage of combustible materials and no particular provisions are made to safeguard them. Some rooms, usually in the basement, are found marked "unassigned" and a ten-to-one shot shows they are used for storage later (as admitted in this case) or even for classroom purposes. We also find storage closets under stairs. If there is a worse place, it will be difficult to imagine one.

[1]State Department of Education, Madison, Wis.

Another hazard sometimes found in schools is the air distribution by means of ducts. Of course these are of noncombustible materials — it is hoped; nevertheless they may be the means of distributing smoke and gases through the building in case of fire. Two such cases have been observed. Here again many of the older schools still have combustible materials involved including the plenum chambers. The design of these ducts is always important. Many modern schools use systems obviating such ducts or at least minimize them.

The use of wood either in terms of roof construction or shingles luckily is on the wane. The latter are probably found in rural areas only, but the former roofs are still with us and apparently are permitted for many two-story structures. (It was such a roof design which was found in the plans discussed.) Even if external causes of a roof fire are infrequent, the internal hazard still exists.

Fire hoses and standpipes are commonly planned for, and in quite a few of the larger schools, especially those in congested areas, we find the automatic sprinkler installed; sometimes in special areas only. Fire extinguishers are a requirement in most localities but the type is not often specified; there are certain rooms and spaces which should be provided with specific kinds of extinguishers. Where an oil fire may be expected the common water type of device is not of much use — it requires a "blanketing" kind to smother such fires.

The location of fire fighting devices is important; they should not only be placed strategically but easily discovered. Red markings are advisable for extinguishers and fire hoses as well as fire alarm stations, which latter should be provided on all floors and basements as well as in the heater rooms (violated in both plan and specifications).

The type of fire alarm is not overly important; both mechanical and electrical devices, gongs and sirens, are found. In the latter case the system often may be connected to the local alarm system; in this case the practice alarm button can be shunted across the municipal system. The break-glass alarm station is usually preferred as it prevents tampering with the alarm.

At this stage of our discussion the matter of applying all of the above to the extended type of a one-story school building came up. The argument my friend made was epitomized in his statement that, "The one-story building cannot exhibit all these hazards, to life in particular, which we were talking about; no stairs, for example, proximity to the outside, case of exit, etc. I'll grant the physical destruction side may be evident, but even that is curtailed materially." Some of this is true but after he was asked, "What would you omit?" his answer was in essence, ***nothing***.

Well, that much was out of the way and now to continue and discuss the mechanical features of safety usually inherent in the planning and subsequent construction.

Some Mechanical Hazards

Let us start with the entrance to the building, frequently requiring stairs or large platforms. In many designs we find a series of outside stairs, architecturally probably defensive — but a beautiful hazard otherwise and subject to all kinds of inclement weather conditions. Then the matter of the South came up where, "of course they have no such hazards as snow and ice," and therefore the previous criticism does not apply? But they do have rain, even sleet, and leaves and debris do accumulate on these stairs, as I can vouch for personally; they may and do exhibit hazards. Such outside stairs should be discarded if at all possible — stairs belong inside. Outside entrance platforms should also be protected and are now being so treated in many designs.

The subject of stairs itself may also be considered in the light of hazards. We find stairs too narrow to accommodate the pupil traffic, risers too high, treads too narrow and sometimes even with a forward slope. Then we find long runs which are fatiguing; broken runs are usually more acceptable. How about safety treads and nosings, either provided inherently or applied separately? The matter of varying riser heights is also important, even though this may be a question of improper construction. But nothing causes greater insecurity of footing than to be confronted with this feature.

Handrails are always included in all designs, but we do not always find two for each stair. If only one must (?) be installed it should certainly be placed on the right side going down as falls are usually down and upward stumbles are rather rare. The rails should be of proper height (not specified in our plan) and extend the full length of the stair run. Wide solid balustrades are sometimes used in lieu of handrails, but certainly do not take the place of an accessible handrail.

Open stair wells are frequently found and should definitely be protected by balustrades made high enough to prevent accidents; the solid type of well seems preferable for obvious reasons. The tops should be provided with some kind of obstructions which prevent the boys and girls from using these tops as ski slides — an "obstacle course" is indicated. An obstruction also precludes the use of the horizontal sections for conference sittings. Surprising what outlandish places young people select for their meetings!

Then we have the corridors to deal with which, on first thought, seem to offer no hazards at all. But look at the open radiators, protruding drinking fountains, walkways restricted by wall projections. We even find lateral stairways with projecting steps. Corridors should be free of all projections and likely everything may be recessed with the exception of locker doors; if there are any lockers, the width of the corridor should be increased to compensate for this as the greatest congestion and traffic is likely to occur where classes pass and lockers are opened. (The plan sinned twice on the above items.)

When it comes to classroom doors, these of course should swing out, and they may well be furnished with clear, shatterproof glass sections; even the slab type of door should be so designed. The classroom doors frequently swing and project into corridor traffic, especially with breather walls of some thickness; in this case the doors may be hung on the corridor side and fold back against the wall in the direction of the main traffic. Where corridor lockers are installed, and these will probably be of the recessed kind, then the loss of a few lockers will pay when other factors are taken into consideration.

Classrooms as a rule exhibit no hazards unless we wish to consider movable desks and chairs as such, but other sections of the school offer plenty of opportunity for accidents and hazards are plentiful. Take the various shops commonly found and we are immediately confronted with machine hazards, slippery floors where wood is used. Sawdust and shavings of themselves are fire hazards; exhauster systems should be provided. The auto shop requires a good and ample exhaust system, as do the welding and forge shops. A well-equipped electrical shop has its own hazards in terms of high voltage and those incident to the work itself.

The science laboratories, especially the chemical laboratories, are very accident prone areas, aside from those produced by the students and their work. The fumes often generated are not only objectionable themselves but represent a health menace — here again an efficient exhaust is needed and not found too often or specified.

The auditoriums, study halls, and libraries are not considered hazardous areas, but the same cannot be said of the gymnasiums. Construction features are important and walls free from projections and covered with a material which is smooth and has some resiliency are indicated; but the material should be such that it can be kept clean. One of the commonest faults of design and arrangement is to place backstops over or adjacent to doors or too near permanent bleachers or out from stages. All are hazardous locations. (Here again our plan failed in this respect.) The playing floor should be large enough to prevent students from being thrown against the bleachers. Balconies, which are often considered a nuisance, need high, netted railings.

Shower rooms have hazards as well; slippery floors, high thresholds to shower spaces, the lack of safe, nonscalding valves,

are common faults. On the health side we require sanitary foot baths and withal — ventilation, including the drying and locker rooms; conditions are frequently really bad in this respect and found just as frequently in modern structures as in old ones.

The swimming pools are also areas where accidents may happen, though it is rather difficult to prevent those due to slippery floors. The spaces about the pool should be free of all obstructions, yet a pool was observed not so long ago which had exposed radiators around the walls. A low curbing around the pool has also been suggested as a safety measure. The springboard should be checked carefully for splinters and secure fastenings — they do splinter and loosen at times. Good lighting both above and under water is another safety measure.

The Boiler Room

Before discussing other types of hazards one should take a look at the boiler rooms. High pressure systems are now rarely found but low pressure jobs have their faults as well. In how many boilers are the safety valves ever tested? One was found removed because, "the darn thing opens sometimes and spatters water and steam around." Another one was minus a gauge — it had never been installed and how the janitor knew what the pressure was — let's skip that one. How about that Michigan school explosion? We have boilers and heaters set in unprotected pits and piping and auxiliaries arranged in such a manner that traffic is a hazard in itself. Where oil is used for fuel its storage is important, and the storage tanks should be located outside of the building.

At this stage our friend decided it was time to again make a few remarks. "Gosh, you must be nearly through checking these plans for safety and hazards; there can't be much left to talk about, is there? Let's call it a day."

"It is true, we have found a good many points where the safety factor comes into the picture, and you will have noticed that a good many of these are not overly well taken care of in your plans. In fact, a few were definitely neglected," was the reply. "But we are not through yet. We have not checked the lighting and electric wiring and equipment, both on the plans and in the specifications; rather important items."

"I am sure those things you will find O.K. because the designer has an engineer in his office who takes care of them." But nevertheless, we went on with the items involved and found plenty to suggest.

The Lighting Hazard

The lighting of classrooms especially is a definite health factor in the preservation of eyesight as the schoolroom tasks are exacting and require a level of illumination too often neglected or not fully appreciated. However we are becoming "light conscious" and in the modern school a good deal of study is apt to be given to this problem. So we usually have good and ample fenestration, and in many instances the artificial lighting has kept pace with it. It may be said that only ten years ago, when 15 foot-candles of illumination was mentioned, the architects and engineers raised their eyebrows; now we think in terms of 40 and even 50 foot-candles — and sometimes we actually plan for it! (But not on the plan my friend had — that called for a measly 12 to 15 foot-candles.)

But other spaces about a school are not too well treated in this respect and show a hazard to life and limb. Ill-lighted corridors and stairs are found in even new schools and the old ones are not the only offenders. Then we have closets and storerooms and heater rooms which are deficient in this as well as other respects, and the gymnasiums and auditoriums likewise too frequently show poor illumination conditions.

One factor inimical to eyesight preservation is the injudicious selection of lighting fixtures; too many give rise to very bad glare which is most apt to show up when a direct type of lighting is used, especially in shop areas where we find much sinning in this respect. Open fixtures, exposed lamps both incandescent and fluorescent, improper location and height of luminaires, all contribute to this "eye hazard." "Let there be light" is a good admonition which may be changed to "Let there be ample light and of good quality" as more in keeping with our thesis of "Preserve the children's eyesight." But my friend was getting restless again. So we went on to the next item of electrical hazards.

Electrical Hazards

How often does one read a caption, "Fire was caused by defective wiring." There is no doubt that many fires are traced to this cause, especially in the older school buildings, which show, even today, open wiring, knob and cleat work, outlets not even protected by loom, metal switch covers, and socket shells. Then frayed cords or those draped over nails and steam and water pipes (oh, yes, they have been met) are but a few of the hazards found, including switchboxes and panel boards in unprotected wooden cabinets. Then the demand for better illumination calls for greater current loads and the ubiquitous No. 14 wire won't carry the load, "gets hot under its insulation" and pouf, we have a fire. Overdrawn? Not at all; all one has to do is to go over an older school building and the proof will be forthcoming. The remedies are obvious.

One old chap, a janitor, told me that he had been laid up for some time due to an electric shock. He had turned on a switch and got knocked down. Investigation showed a metal covered surface switch with metal toggle handle and a wet ground. Why he was not electrocuted is unknown — but switch and ground were still there, though the latter was somewhat dry this time. Fortunately the newer structures are now universally wired under the National Electric Code, let us hope, and conditions are much better than of old; but even here caution in dealing with electrical devices is indicated. All machinery utilizing electric motors should be grounded, all wiring in steel and operating devices well insulated.

One area of even a modern school should be watched for infringements of electrical safety rules, that is the stage of the auditorium. Too often the amateur stage electrician gets original notions of how to wire for stage productions and the result is sometimes unfortunate. He will rewire without regard to hazards, use homemade spot and floodlights, tack up cords, and do miscellaneous tinkering neither too wisely nor too well. He bears watching. Overloading of circuits is a common fault.

One last word on this subject ("No, that has not been exhausted by any means") and that is in connection with the use of electric irons in the home-economics work. The red telltale light on these circuits is an elementary safety measure not always found. (You are right; they were not specified on our plan.)

"Well, that's that!" said the superintendent. "That was some task and I had no idea there were so many things involved when we started out checking and you told me that the safety factor was an important part of any planning. I guess our planner did a bum job in this respect."

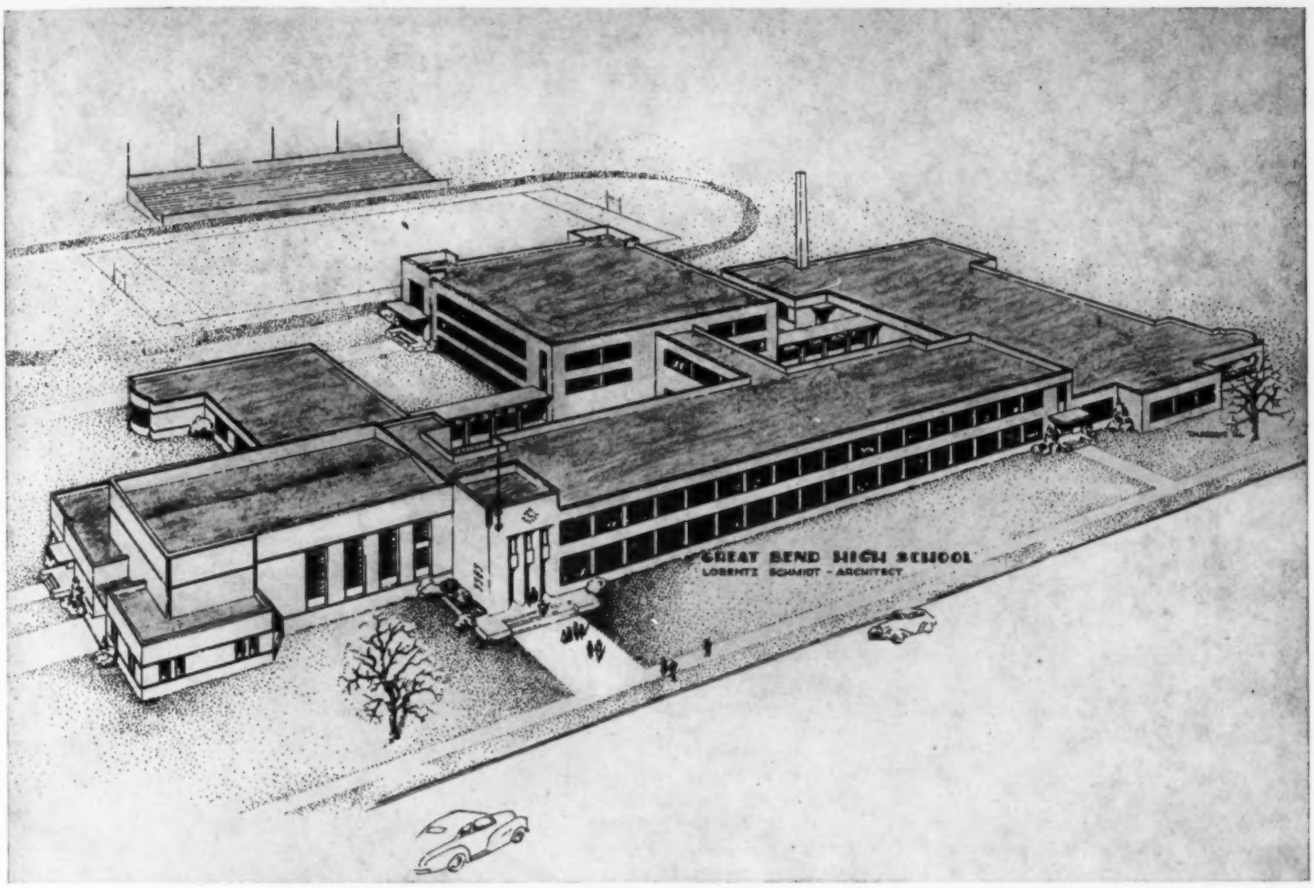
"No, we can't say that," I answered. "He was probably more interested in the more obvious features of planning and arrangement, during which many of the items discussed disappear. Many plans and specifications checked have similar omissions — they are just forgotten. Your plan as a whole is rather good."

Maintenance and Health Hazards

"But before we 'disband,' " I said, "let me call your attention to another feature of your new building, for which someone, possibly you, will have to be responsible — and that is maintenance. You will find this quite intimately tied up with the future effectiveness of your school, though I shall mention only those elements which are a part of building safety; there are plenty of others which I shall not touch, so here goes."

The best planned structure is subject to deterioration, and with improper maintenance the safety factor is bound to be reduced. For example, floor maintenance may lead to bad results when we find so many floors highly waxed and polished, under the erroneous idea that a good appearance is the prime requisite when, as a matter of fact, the slippery floors are hazardous. Not only floors, but worse yet are stair treads treated in a like manner

(Concluded on page 81)



Architect's Perspective for the Great Bend High School, Great Bend, Kansas. Lorentz Schmidt, McVay & Peddie, Architects, Wichita, Kansas.

Great Bend Makes Its Plans Real

Great Bend is a thriving community in mid-c ntral Kansas. With good reason the Chamber of Commerce stickers read, "The Oil Capital in the Heart of the Wheat Belt," and the call letters of the radio station KVGB mean "Kansas Vast Grain Belt." There were no "war industries" in the community, but an air base was located a few miles from the city limits.

The community population has grown from 5026 in 1935 to 10,200 in 1945. This has meant a doubling in population, with no provision for additional school space. Just at the beginning of the war years, the community voted bonds for a new building under a special legislative enactment, but because of a slip in the phraseology of the ballots, the issue was declared illegal. Then came the war years, with their stoppage of school construction. Those years gave the people of Great Bend an opportunity to see the crowded conditions grow until they seriously hampered the efficiency of the entire teaching staff. The lack of local housing also kept some good teachers from coming into the system.

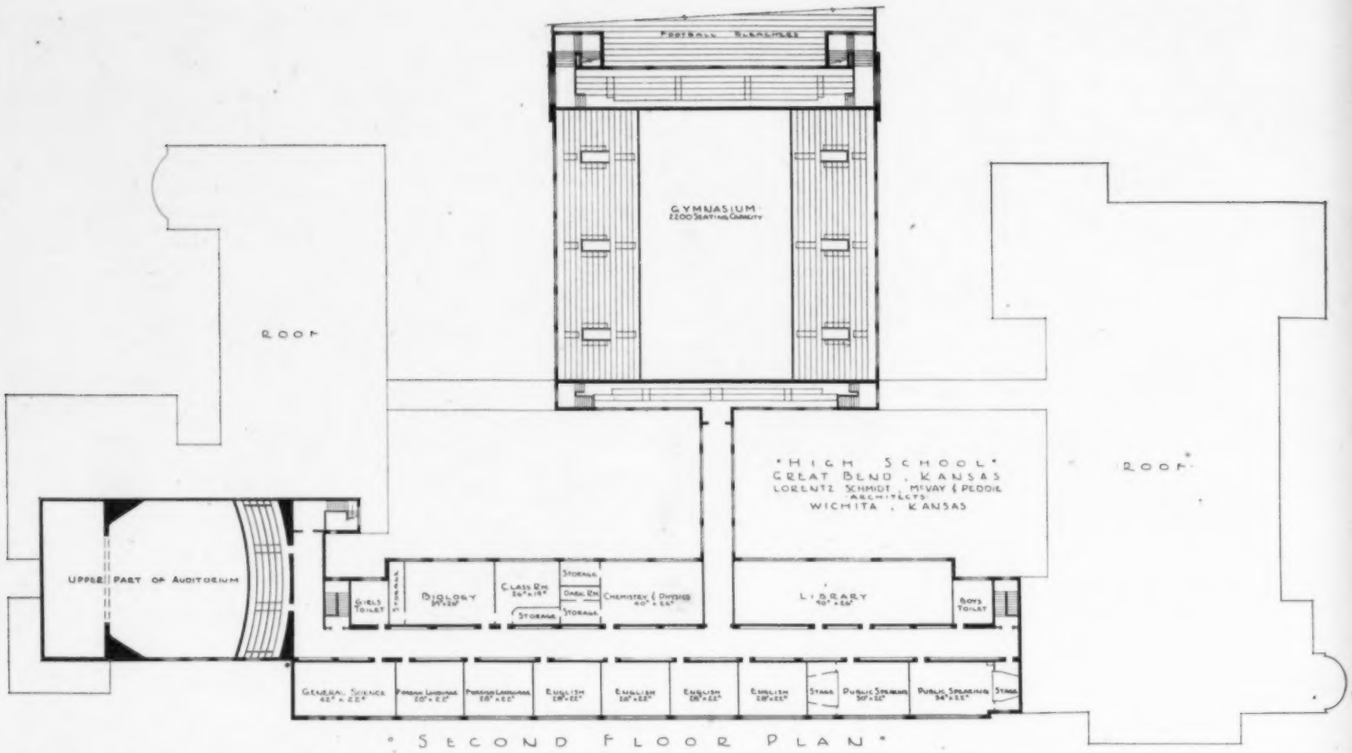
Troublesome Legal Limitations

Not until 1945 did the legislature of Kansas see fit to allow boards of education in second-class cities to levy a small tax to prepare for emergency educational building. This legislature made it possible to levy a two-mill tax for the "purpose of construction, reconstruction, additions to, furnishing, and equipping of school buildings, architectural expenses incidental thereto, and the acquisition of school building sites."

Of course, the law pertaining to the issuance of permanent bonds for school construction is much the same in Kansas as in other states. The boards of education may call a bond election at which a favorable majority of votes cast authorizes a bond issue. However, not enough funds could be raised in this manner to finance the needed program for Great Bend, because of the following prudential limitation in the law: "The total indebtedness of the said board of education shall not thereby be increased to an amount exceeding three and three fourth (3¾) per cent of the assessed valuation of the territory within the jurisdiction of the said board of education."

In 1944, all these problems faced the newly elected superintendent, and of course V-J Day had not yet come. A rapid survey of all the pertinent school law relating to finances was made by the new administrator. This study revealed the existence of an old act, under which a petition signed by not less than one half of the electors entitled to vote on an issuance of school bonds could be accepted by a local community for an additional bond issue. This law authorizes and empowers "the Board of School Fund Commissioners of the State of Kansas to make an order authorizing any city or school district to vote bonds for the purpose of erecting school buildings to an amount not more than one hundred per cent in excess of, and in addition to, the amount of bonds that may be voted under laws now in force."

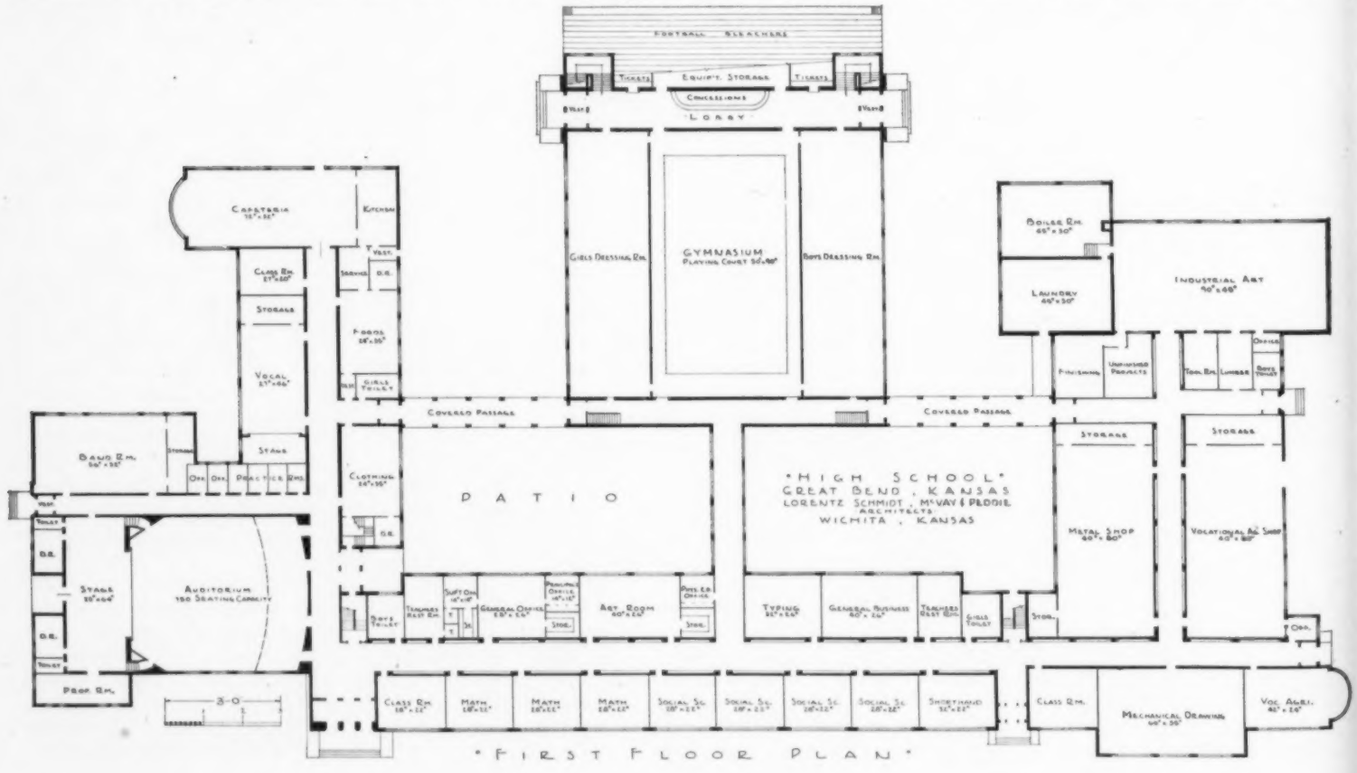
After gathering all the facts, Superintendent Sheldon and the board of education decided that since the prevailing interest rate



on school bonds was exceedingly low, an attempt should be made to launch a bond election within the law just cited. The bonds proposed would represent 7½ per cent of the total assessed valuation of the district. By checking with the State School Fund Commission, the administration found that the district could bond itself for $667,400. Upon consultation, the architect expressed the opinion that such an amount might care for the necessary building program of the system.

An Old Law Invoked

As can be seen, the "fly in the ointment" was the securing of "at least 50 per cent of the qualified voters." The education committee of the Chamber of Commerce and a group of other citizens were consulted as to the best plan of securing the necessary signatures. This committee in turn asked a group of 70 citizens to meet with the board and out-



Board of Education, Great Bend, Kansas.
Left to right: E. R. Sheldon, superintendent of schools; W. H. Phillips; L. J. Zutavern, vice-president; H. C. Colegrove, clerk; C. F. Heaton, president; Dr. John Robison; Edward Opie, treasurer; Wayne H. Bentley; Herbert Diets, attorney; Ira E. Farmer.

lined the following petition: "We, the undersigned, being not less than one half of the electors of the Great Bend School District No. 1, Barton County, Kans., entitled to vote for the issuance of bonds of said school district, hereby petition and request that your honorable board of education file an application with the Board of School Fund Commissioners of the State of Kansas, for permission to vote on the question of issuing $667,400 of bonds of said school district for the purpose of extensions and additions to existing school buildings, and the erection of new building, or buildings, which issue is in excess of 3¼ per cent bond limitation under the laws now in force unless the consent of the said Board of School Fund Commissioners is given. If such board gives its consent to the issuance of such additional bonds, then we pray that a vote be taken in the said school district upon the question of the issuance of bonds of the said district, in the amount of $343,200 as authorized by the said School Fund Commissioners for the purpose of extensions and additions to existing school buildings and the erection of a new building or buildings."

The group went to work and after five days of hard personal work, and many meetings, the city clerk was in a position to certify that at least 50 per cent of the voters had signed the petition.

The Election Approved

The next step was to make formal application to the State School Fund Commission for permission to hold the election. Since the petitions were a mandate from the community, this permission was secured quite readily. After a hurried trip to the State Capitol, the legal adviser to the board, Herbert Diets, and Superintendent Sheldon held a meeting with the board and the same evening asked the city government to place the bond issue on the regular city election ballot on April 2, 1945. The preparation of the legal notices and the other legal procedures required many special meetings of the board of education and much painstaking work.

The project could not have been carried had not active help been given by interested citizens in every major group and business house in the city. The determined group of citizens who wished adequate housing for the school were prepared to take the initiative in securing wide support of the bond issue. The facts collected in a carefully prepared study were widely used to convince every citizen that a proper school plant must be had without delay. Failure would be nothing short of a calamity. Splendid co-operation was given by the local newspapers, and though the campaign was short and intensive, effective publicity was given the bond election in almost daily news releases.

It was a well-informed group of citizens who went to the polls. When the votes were counted, it was found that the school bonds had won by a 5-to-1 majority.

Co-operation Basis of Success

It may be interesting to note that the election was the first use made by a second-class city of the permissive act for doubling the bond limitation which had been a part of the school law since 1911. Unquestionably, the success gained was due to the co-operative spirit shown by all the community groups. The task of initiating and planning the campaign was performed by the responsible board of education and the school executives; interested citizens gave group co-operation; and final success was assured by the actual work of individual men and women who gave freely of their time and ability.

The beautifully planned high school building of modern design will be located on an 18-acre tract, purchased several years ago. Additions to the various elementary schools are to be constructed at the same time. Citizens of Great Bend will have a lasting monument to the co-operative teamwork of the community and the wise planning of their superintendent. As Superintendent Sheldon said, "It required the 'everlasting teamwork of every bloomin' soul.'"

NEW YORK CITY BOARD TO ERECT BADLY NEEDED SCHOOL BUILDINGS

Mayor O'Dwyer and the board of education of New York City, in a joint statement issued in December, have announced their intention to build badly needed new schools within the limitations of high construction costs and material shortages.

Plans for most of the proposed projects in 1947 are ready or almost ready, and site acquisition and clearance is under way. In some cases, it is the purpose of the board to utilize the finished plans of other new school buildings which will be easily adaptable to the areas to be served.

The board has recognized that immediate relief must be provided for many areas where school facilities either do not exist, or are in no position to absorb any overflow. These schools must be given prompt attention regardless of the cost. The board has decided to proceed.

The American
School Board Journal
A Monthly Periodical of School Administration
Edited by
Wm. Geo. Bruce and Wm. C. Bruce

SCHOOLHOUSES FOR 1947

SCHOOL authorities who were puzzled by the school building problems of January, 1946, will readily admit the utter confusion in which the year 1947 opens. Materials in a number of fields are more difficult to get than at any date in the past five decades; labor is less efficient and scarcer; contract prices have soared to unbelievable heights; recent salary problems have almost wholly shifted the attention of school boards to teacher employment; planning standards for classrooms and total buildings are undergoing renewed study and promise widely increased usefulness of the new structures.

In spite of all the difficulties, the year 1946 has produced a surprisingly high number of new school buildings. The total expenditures of 1945 were in fact doubled, and contracts were let for nearly 2300 buildings, at a total cost in excess of $214,272,000, and a total floor area of 26,135,000 square feet. That school boards did not let contracts for the total number of buildings contemplated is evidenced by the fact that permanent school bonds were sold in the amount of $289,037,960. In other words, slightly less than three fourths of the outlay contemplated in the bonds voted and sold has actually been applied in building contracts.

In a large proportion of the communities the school boards are still in the planning stages of their programs. These communities will be able to take advantage of the strong impetus to the scientific planning given by the National Council on Schoolhouse Construction which has abandoned its long established policy of laying down minimum standards of quantity and size, and has enunciated general principles and techniques for the planning of classroom areas, the over-all planning and integration of departments, the large special rooms, the service departments, the lighting and ventilation, the safety factors, sanitation, etc.

The recent estimates of cost and the contracts for school buildings let during the closing months of 1946 have reached the unprecedented height of $1 to $1.25 per cubic foot. It would appear that the maximum has been reached in these prices and that lower contract prices will be made as soon as the home and industrial building scramble has spent itself. If the pattern of building prices as developed during 1919–22 is repeated, we should see some relief in costs before the end of the summer.

The financing of new school buildings will depend more than ever on bond issues. The large increases in teachers' salaries are certain to deplete current school district funds and to make necessary increases in tax levies, in some cases to the limit of the permitted millage. In such instances, any hope of continuing a pay-as-you-go plan becomes hazardous, if at all possible. Fortunately, the turn in bond prices which began in March last has been so gradual that interest rates are still extremely favorable to school boards. At present high costs local school districts in numerous cases cannot meet their building needs, even when they bond themselves to the limit. There is, consequently, more than ever need for state and federal subsidies to local school construction if the vast backlog of needs is ever to be met.

The advice given in this column a year ago still holds: in cases of immediate need, the interests of the children must be given precedence over all economic considerations.

THE ST. PAUL STRIKE

BOARDS of education are likely to misunderstand the St. Paul teachers' strike unless they know that the capital city of Minnesota has no board of education, but administers its schools through the municipal commission. One member of this body chosen for the work by vote of his associates is the immediate superior of the superintendent and of his professional associates in the school administration. The city charter places limitations on tax funds for certain current city expenditures, and the schools are hedged in by the general disposition of the city commission to allow the various city departments to share as best they may the available funds. Citizen interest in education has never risen to the point that has compelled favorable action for adequate teachers' salaries. The labor situation for several decades has included elements quick to use the strike weapon, and it is no wonder that the teachers' union has been inclined to follow the example of the associated local unions. The significant fact in the situation is the long delays, the evasion, and the refusals of the responsible city executives to give the teachers any hope of satisfaction. The plan of using the cost of living index for annual salary adjustments has failed because the character of the teachers' work and its importance have never been recognized.

At the time of writing the strike is in full effect and not much progress has been made toward an equitable solution. We do not believe that the St. Paul teachers can win this strike. They will obtain most if not all the increases they ask, and their demands for special advantages probably will be recognized in a new city charter. But they still will lose the strike; they will lose local and regional estimation of themselves as a professional group of high purpose, whose first and chief interest is the education of the children and the higher social and civic welfare of the community. The strike is not a proper weapon for a teaching group unless its members are willing to admit that they lack the intellectual and moral force to fully convince the officialdom and the people of the superior truth of their claims, so that the press and public opinion will force favorable action.

The St. Paul strike should suggest forcibly the need for school boards generally to study their salary schedules and to readjust them to the new reduced purchasing power of the dollar. It should suggest too the serious need of better personnel policies recommended from time to time in these columns. There can be no strike in a community where the school staff and the board of education have another's full confidence and where they co-operate for the children's best interests.

The problem of the teacher supply in 1947 is essentially a problem of school finance, of adjusting the thinking of school boards and taxing bodies, of local communities and taxpayers generally to the inflationary conditions of our national economy and of readjusting school tax income to the entirely new needs. The St. Paul strike and other smaller teachers' work stoppages, together with the California state-wide decision to make $2,400 the minimum wage, have provided incidents which bring home the seriousness of the situation, and should precipitate action both on the local and state levels for increased taxation for all school needs. Legislation will be needed in many states, with considerable attention not only to new and enlarged forms of taxes, but also to economy measures made possible through enlarged school districts and other equalizing means.

The American Federation of Teachers no-strike policy remains unchanged and locals in Minneapolis and St. Paul "must take any consequences which may follow their decision to violate that policy," said Irvin Kuenzli, AFT national secretary, in a letter to the teachers' unit of Mobile, Ala. The inquiry concerning the no-strike policy was made by Mrs. Anna H. Havens, as a result of the teachers' strike in St. Paul.

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The Important Preliminary Steps in —

Planning School Buildings for Rural Communities

*John E. Marshall**

As we left the building, two automobiles drove from the main highway and approached the Nebraska rural school we had just visited. They stopped near us. Ten men, some in overalls and some in business suits, got out. "We'd like to look this school over; we were told it's a good one." They explained that they were the board of education from another Nebraska rural community, eighty miles away. Dr. Stoneman and I identified ourselves: we, too, were visitors, he from the University of Nebraska and I from West Virginia. We, too, had come some distance to look at a well-planned rural school. We talked with the board members.

"We don't build a school very often," said one of the men. "The building we have now is over thirty years old. It's overcrowded, because our population has grown; but more than that, it just wasn't built for the kind of teaching we have today. The new building we're going to plan now will probably last just as long; so we've *got* to do a good job of planning it."

In ten thousand miles of travel and visits with rural educators, architects, school plant specialists, and laymen in many states, perhaps the most significant thing I saw was the visit of that school board to look at a good rural school. Significant, because it illustrates the sincere desire small communities have to erect school buildings after the same kind of careful planning that now characterizes school plants in our larger and wealthier districts.

Good Planning Available

Can such planning be obtained by smaller districts? The rural superintendent has multiple duties which preclude his being a school plant specialist. The rural board of education faces only once in a generation, normally, the task of planning a building. The range of architectural service available to the small town or country board of education includes many competent architects, but fewer school building specialists. Is it hopeless, then, to expect a modern, efficient school plant in a rural community?

Of course not.

A school plant is modern and efficient not because it houses a large school, but because it houses a school program *well;* not because it is expensive, but because the dollars spent bring a return in the space and comfort needs of the educational program. Architects and schoolmen are working together better than ever before to achieve school buildings that are healthful, safe, and comfortable; that are adaptable, attractive, and efficient — and all these, within a valid concept of economy. Expert assistance is available from the state department of education in most states, or from the state university. And everywhere — in rural communities especially — an earlier approach to the problem of designing school facilities and a greater realization of the inseparable relationship between school *plant* and school *program* is disclosing new possibilities in effective design of school buildings.

Educational Planning Comes First

A primary consideration in designing a rural school building is to start the planning early enough that it may include the *educational* planning — the thinking and communicating that must go on among school administrators, board members, teachers, pupils, and citizens, before the architect lays pencil to paper. Shall we consolidate? What shall we teach? What groups will use the building? — these problems cannot wait until the new building is completed.

Indeed, there is no better time for a re-evaluation of the school's total program than just before a new building is planned. What experiences should our school offer that we can't offer now, because of an inadequate school plant? What subjects have we retained long after their period of usefulness in our community? What groups in our community might the school serve better? In what ways? What needs of adults, of preschool children, of youth now out of school, can we fill?

No board of education alone, no administrator alone, can answer these questions. Here, then, is an opportunity for wider community participation. What do the citizens want from their school? Ask them, and they will tell you. Could the school library lend books to adults, and to children as well during the summer vacation? Yes, if the library is on the ground floor and has a separate entrance. Could a community hobby club meet at the school and work on projects in various materials? Yes, if a suitable room is available with *extra* storage space for such projects. Could the softball teams of local adult groups schedule games on the school field? Yes, if ample area is provided. The ways in which a school can serve its community are countless. Some require special facilities. Some require only careful programming. Some require detailed planning for multiple use of rooms. Others require simply time, or space, or a willingness on the part of the school authorities to have the building serve more widely.

In every instance there is available a wealth of public interest in the school being planned, and valuable helps in the planning if principals, teachers, custodians, pupils, and citizens are asked to participate, at appropriate levels, in determining what goes into the school building.

A school building so designed will be an expression of what its community believes about education. And that is what it should be.

*Supervisor of Surveys and Schoolhouse Planning, West Virginia State Department of Education (on leave).

Assistance in School Building Planning by the Bureau of Educational Research, Ohio State University

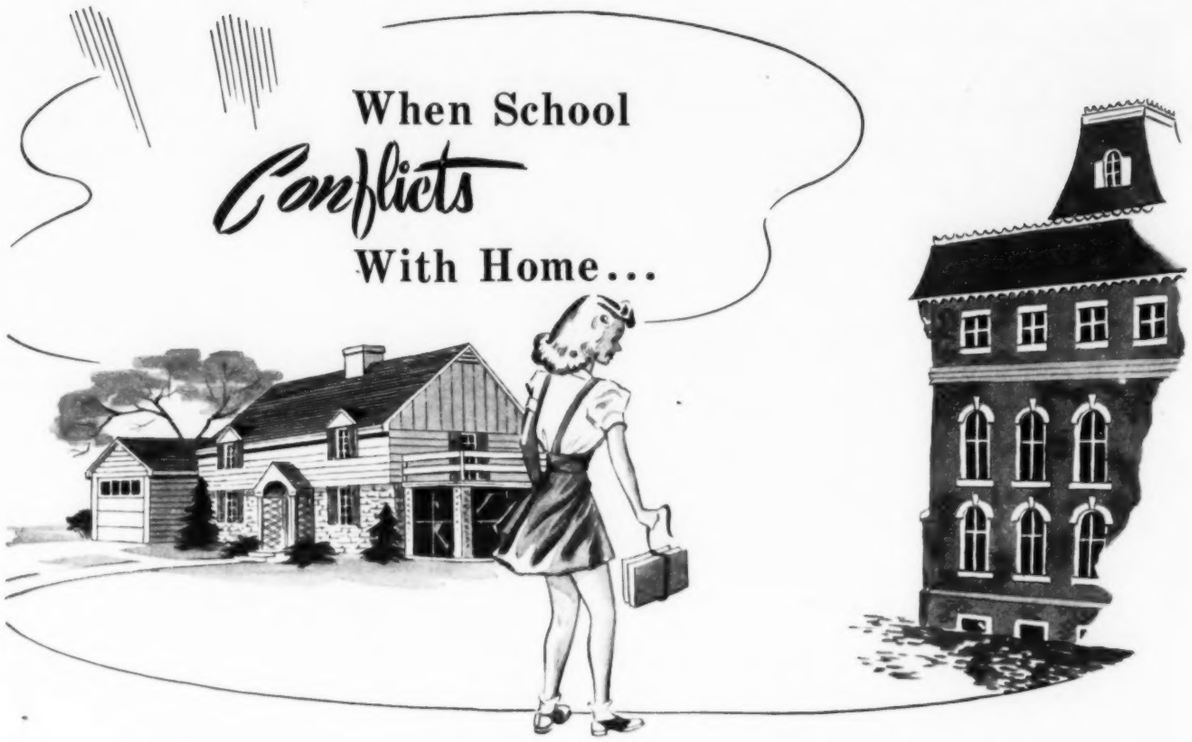
W. R. Flesher[1]

The great interest of Ohio boards of education and school superintendents in planning for school plant improvements is evidenced by the studies in this field being made by the Bureau of Educational Research at Ohio State University. The studies of school-building needs are made by the Survey Division of the Bureau under the general direction of Dr. W. R. Flesher, head of the Division, and Dr. T. C. Holy, director of the Bureau. The extent of school-building needs is indicated by the estimated cost of the recommended projects. During the school year 1944–45 the Bureau made, or co-operated in making, school-building surveys in 15 Ohio districts in which the estimated costs of the recommended programs totaled approximately $56,000,000. During the past school year studies of school-building needs were completed in 22 Ohio school districts; the estimated costs of the improvements recommended totaled approximately $13,000,000. During the current school year assistance in the field of school-building planning is being provided to 20 Ohio school districts. The larger districts included in this group are: Cambridge, Coshocton, East Liverpool, Greenville, Newark, Troy, Van Wert, Wyoming, and Xenia.

The primary purpose of the Bureau's studies in the field of school plant improvement is to determine the number and locations of school centers needed, the over-all size of each building, the grade group to be housed in it, and the use that can be made of each existing school building in the recommended plant-improvement program. The survey reports include also the estimated costs of the building programs recommended.

As a follow-up to this type of service the Bureau initiated two years ago an educational consultant service to assist in planning the specific building requirements to house a planned educational program. This service is under the immediate direction of Willis A. Whitehead, who has a degree in architecture as well as several years' experience in public school and college work. This consultant service involves organizing the school personnel of the district into various committees for the purpose of planning an educational program. Mr. Whitehead then works with the architects to assist them in translating educational requirements into architectural design. The Bureau is providing this type of service in seven Ohio school districts at the present time.

[1]Head, Survey Division.



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WORD FROM WASHINGTON

Elaine Exton

The New Year will bring to children and teen-agers of this country and of the world increased opportunities for health, happiness, a good education, adequate counseling, and recreation if American communities give effect to the recommendations of three recent Washington conclaves: the National Conference for the Prevention and Control of Juvenile Delinquency, the Meeting of the National Commission on Children and Youth, the National Conference on International Educational Reconstruction.

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The National Conference for the Prevention and Control of Juvenile Delinquency convened in Washington on November 20, 21, and 22, 1946, at the call of the Hon. Tom C. Clark, Attorney General of the United States, "to consider and recommend a program of specific action in the various fields which touch on juvenile delinquency problems."

In his opening remarks before this Conference, the Attorney General said: "The present situation is such that each community in America, from the largest to the smallest, must accept its responsibility if our country is to avoid a wave of delinquency perhaps greater than ever before in our history."

Grim evidence was found in statistics issued ten days previously by J. Edgar Hoover, director of the Federal Bureau of Investigation, who reported an upward sweep in postwar crime marked by sharp increases in juvenile delinquency. Age 21 predominated in the frequency of both male and female arrests. The most pronounced increases among boys were 21.5 per cent in the 18 to 20-year-old age group and 69.7 per cent in the 21 to 24-year-old group over the corresponding nine months in 1945.

Reports on Juvenile Delinquency

Ways and means to check this increase are set forth in 16 separate reports drafted at the Conference and approved after full discussion. Their subjects follow: Community Coordination; The School as a Preventive Agency; The Church; The Home Responsibility; Housing, Community Development and Juvenile Delinquency; Mental Hygiene and Child Guidance Clinics; Recreation for Youth; Citizen Participation; Youth Participation; Case Work and Group Work Services; Role of Police in Juvenile Delinquency; Juvenile Court Laws; Detention Facilities; Rural Aspects of Juvenile Delinquency; Statistics. These reports are now in preparation for printing. Each averages approximately 70 pages and will be published separately by the Government Printing Office. Orders may now be placed with the Superintendent of Documents, Washington 25, D. C., although it will probably be March before they become available.

Educational Recommendations

Stressing that an all-round good school helps to prevent delinquency, Attorney General Clark pointed out that "the school is strategically placed to reach practically all children and in a position to recognize attitudes and behavior that may be forerunners of delinquency."

The report of the School Panel, chairmaned by Thomas G. Pullen, state superintendent of schools, Maryland, and Dr. Donald DuShane, executive secretary, National Commission for the Defense of Democracy Through Education, makes specific recommendations and outlines four responsibilities which the school should meet in order to fulfill its obligations to the delinquent or potentially delinquent child:

1. It should plan its program to meet the needs of all children.

2. Teachers should identify those children who show signs of developing delinquent behavior and should have time to learn their physical, social, mental, and emotional limitations in order to take proper preventive measures.

3. Teachers should work closely with parents and neighborhood leaders to assist them in better understanding of the individual child and to help them solve any family or neighborhood problems that may be unfavorable to the child's development.

4. The school should co-operate with all community agencies in a co-ordinated plan aimed against juvenile delinquency.

At least 1000 delegates participated in the Conference deliberations. They included representatives of thirteen federal agencies; members of executive, legislative, judicial, and administrative branches of state, county, and municipal governments; representatives of organized education, labor, farm groups, business associations, fraternal orders, church groups, as well as professional and lay members of national and local private welfare agencies.

Impressed by the meeting the delegates hoped that states and communities through-

(Concluded on page 68)

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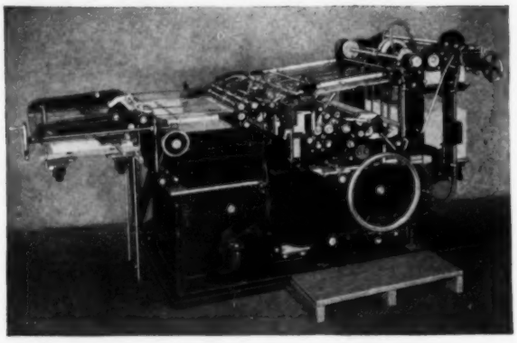

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(Concluded from page 66)

out the nation would call conferences for the prevention and control of juvenile delinquency patterned after the National Conference and with the same type of balanced representation.

National Conference on International Educational Reconstruction

As an American contribution to the celebration of "UNESCO Month" the Commission for International Educational Reconstruction of the American Council on Education convened a National Conference on International Educational Reconstruction in Washington, on November 22 and 23, 1946, which was attended by representatives of more than 100 national private organizations — educational, civic, religious, relief, labor, scientific — and by observers from Government Departments with related interests.

Reports presented by Solomon V. Arnaldo, senior counselor, UNESCO; Dr. Lennig Sweet, program director, United Service for China; Dr. George F. Zook, president, American Council on Education and chairman of the recent educational mission to Germany; Dr. Harold Benjamin, director, U. S. Office of Education, Division of International Education Relations and a member of the recent mission to Japan; Dr. Harold E. Snyder, executive secretary, Commission for International Education Reconstruction, and others who have recently visited war-devastated countries showed that "two years after liberation, thousands of children in Europe are still without schools, and still lack even the simplest educational materials — books, pencils, paper."

Conference participants agreed that "speedy action is needed to save the 'lost generation' of the countries occupied by the enemy. These youth, aged 10 to 20, have suffered hunger, cold, disease, and the terrors of war and enemy occupation. Their education has been neglected or has been received almost entirely under Axis direction. . . . If further neglected today, they may become the soldiers whom our children must face on the battlefield tomorrow."

Major recommendations of the Conference include:

1. Provision of educational supplies and materials without discrimination as to race, creed, color, or political belief for displaced children and former enemy as well as allied nations, with priority in assistance given those in greatest need and steps taken to insure adequate reporting from recipient to donor.
2. Increased efforts by federal, industrial, and private agencies for at least two more years to meet the utter lack in many areas of books and periodicals.
3. Special assistance for teachers, including financial assistance to permit them to buy basic essentials, since inflation has impoverished the teaching profession in most countries.
4. Provision of thousands of fellowships and scholarships in American universities for advanced foreign students with passage of the Bloom Bill and the speedy implementation of the Fulbright Act sought to help accomplish this.
5. Encouragement of 'volunteer service groups' or 'educational work camps' that provide American students with an opportunity to join with students of other countries in rebuilding destroyed schools and other public facilities.

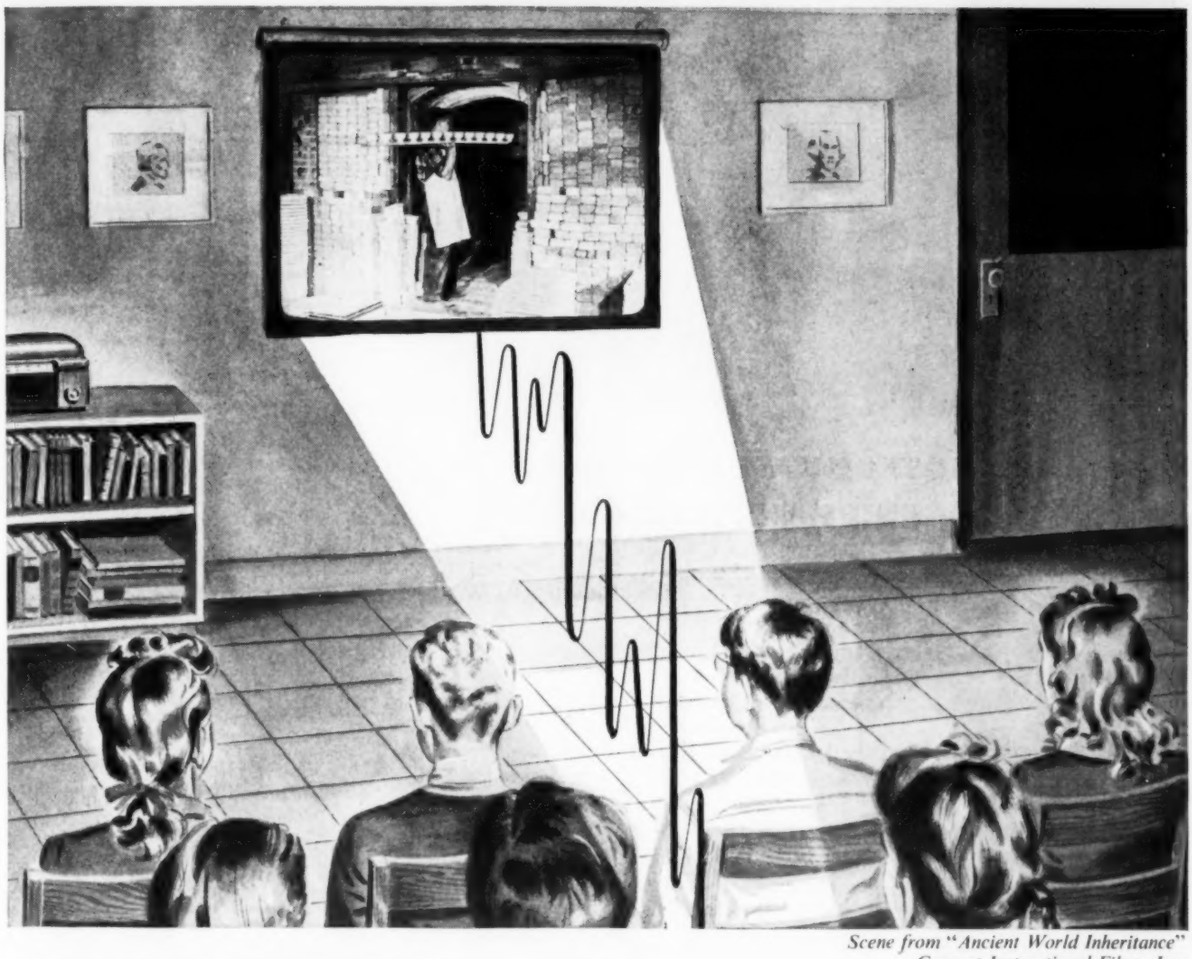
Commission for International Educational Reconstruction

A series of conferences called by the American Council on Education in the Spring of 1946 and attended by representatives of the Department of State, the U. S. Office of Education, UNESCO, UNRRA, and leading educational organizations resulted in the formation of the Commission for International Educational Reconstruction with Thomas G. Pullen, Maryland State Superintendent of Schools, as chairman, and officials of 20 important American educational organizations as members.

Aided by an initial grant from the Carnegie Corporation the Commission is seeking:

1. To inform the American people of the educational needs of youths and adults in the war-devastated countries, serving particularly as a channel for communicating to American organizations urgent needs for assistance reported to the Commission by UNESCO, UNRRA, and government agencies here and abroad.
2. To assist American organizations in planning and developing effective programs of educational rehabilitation and reconstruction by providing advice and aid in securing pertinent information from governmental and other sources concerning facilities for shipment of materials and the sending of advisory missions.
3. To effect working relationships and co-ordinated planning between voluntary agencies in the United States and other contributing countries.

In January the Commission will make available a free handbook briefly describing the programs of about 60 agencies in the United States that are engaged in international educational relief, rehabilitation, and reconstruction.



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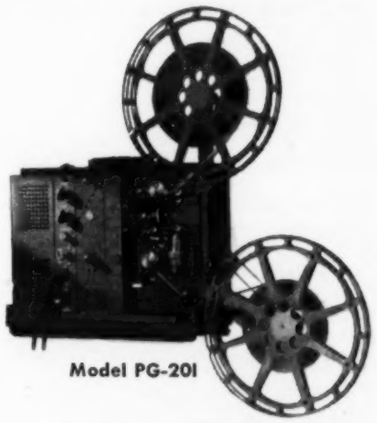

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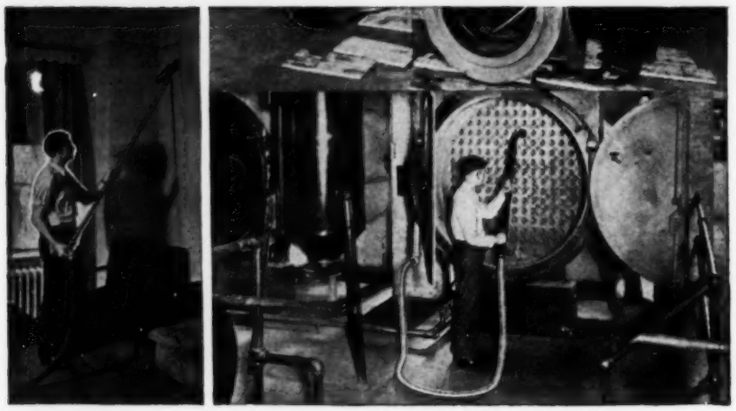

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School Business Executives

Effects of Classroom Lighting on Child Development

By Bernard G. Combs, B.S., M.S. Paper, 35 pp. Price, $1. Published by the author, Bernard G. Combs, at San Angelo, Tex.

The author maintains, on the basis of fact, that inadequate lighting in the classroom has tended to handicap pupils with respect to their normal growth, their learning opportunities, and their health and behavior attitudes in general.

The studies made in the John H. Reagan School were conducted in two areas: (1) the physical conditions in the ordinary classrooms and the improved conditions in the modified rooms were tested for window and artificial illumination, reflective values of walls and ceiling finishes, seating arrangement, and window treatments. (2) In both types of rooms the pupils were measured, with standard test materials, for achievements in the regular studies, mental alertness, physical fitness, and behavior. The results leave no doubt concerning the value of (1) light deflectors on the windows, (2) wall finishes of high light reflecting quality, (3) informal seat arrangement for turning pupils slightly away from windows, (4) diffused supplementary lighting of the fluorescent type.

Stoker Heating Guide

By K. C. Richmond. Paper, 23 pp., 10 cents. Published by Coal-Heat Magazine, 20 W. Jackson Blvd., Chicago, Ill.

This booklet is addressed to users of small stokers and suggests methods which will prolong the life of the stoker, promote heating results, protect health, reduce heat losses, save fuel, and cut costs.

Fuel Delivery Guide

By K. C. Richmond. Paper, 35 pp., 10 cents. Published by Coal-Heat Magazine, 20 W. Jackson Blvd. Chicago, Ill.

This guide for retail coal yard and delivery personnel, describes proper handling and delivery methods, truck operation, and accidents.

A 6 2 Guide for Modular Co-ordination

By M. W. Williams and Prentice Bradley. Cloth, quarto, 290 pp., $10. The Modular Service Association, Boston 16, Mass.

This publication advances in an important way the project of architects and building materials manufacturers for standardizing the sizes of both the component parts of buildings and of buildings themselves.

Unquestionably, the co-ordination of dimensions of materials of construction is an important element for increasing the efficiency and the economy of all aspects of architectural design and building construction. The present book presents the total progress which has been made since 1938 and takes up (1) the basic principles of standardization, and in successive chapters, (2) the application of these standards to masonry, facing tile, custom masonry, floors, wood-frame construction, windows, doors, glass-brick, skeleton-frame construction, and stairs. All of the recommended practices are illustrated in application by the complete plans of a typical modern building. The underlying theory is presented in a series of appendices.

The book is an essential tool in every school business office where school-building planning or remodeling is carried on.

Annual Report of the Supply Commissioner of the St. Louis Schools, for the fiscal year ending June 30, 1946

Paper, 62 pp., Published by the board of education of St. Louis, Mo.

This report outlines the policies and the actual work carried on by the supply division of the St. Louis schools in handling some 13,403 purchase orders, filling 64,137 school requisitions, distributing 1,651,000 textbooks, repairing 232,000 textbooks, providing materials for serving 1,317,777 lunchroom meals, and carrying on numerous additional activities all involving a total outlay of $1,952,874.12. The report includes recommendations for expanding the bookbindery, improving the handling of the stock, readjusting the administration of the lunchroom division to properly handle its increased load, and in general to handle various replacements of equipment and materials. The report will be found especially valuable by school executives who desire to study an efficient large city supply department.

Modern Designs for Prefabricated and Demountable Buildings

Paper, 97 pp. Published by the Office of Production Research and Development, War Production Board, Washington, D. C.

This report, compiled by the Industrial and Consumer Products Branch of the Office of Production Research of the War Production Board, offers designs of emergency prefabricated structures suitable for various uses. Reference is made to "stock-pile" structures in steel, and in steel and wood, offering several widths of structures that may be assembled from standard parts. The designs are of structural frame, arched roof structures, the walls and partitions being of the nonload bearing type. Through the use of standard parts, different sorts of buildings can be assembled, each having flexibility of interior space, and suitable for many uses. The study deserves consideration in connection with temporary, one-story school buildings.

Queensbridge School Facilities for an Industrial Community

By M. C. Cassileth. Paper, 60 pp. Published by the Division of Housing and Business Administration of the New York City board of education, Brooklyn, N. Y.

This report of the Division of Housing and Business Administration, under the direction of Dr. N. L. Engelhardt, deals with the present inadequate school facilities and the future needs of an unusual community adjoining the East River in Brooklyn known locally as the Queensbridge Section. The neighborhood has had the benefit of a slum clearance activity which has involved the erection of splendid apartments, planned by USHA. The study originally formed the basis for site selection for several new buildings and the present report presents in simple, factual form data concerning the general characteristics of the neighborhood, the social and racial status of the people, the character of the housing, the public and private institutional facilities, and the probable changes which will occur and which must be taken into account in planning new school buildings. The report definitely recommends the educational facilities which the new schools are to provide, both for children and for the adult community.

Community Centers as Living War Memorials

Compiled by James Dahir. Paper, 63 pp., 50 cents. Russell Sage Foundation, New York, N. Y.

Community centers have been the interest of the Russell Sage Foundation over a long period of years. As early as 1910, a member of the Foundation's staff advocated the establishment of centers in all school buildings. The present report is the result of a study of developing "living war memorials" as possible community centers. The report takes up applications of the idea of living war memorials, suggests practical helps for com-

munities planning war memorials, and offers many types of community centers, involving general and above types.

A Study of Public-School Building Needs of Boardman Township, Mahoning County, Ohio

By T. C. Holy, W. R. Flesher, Eldon B. Sessions, Burvil H. Glenn, and Willis A. Whitehead. Paper, 90 pp. Published by the Bureau of Educational Research, Ohio State University, Columbus, Ohio.

This study of a prosperous residential township in the Youngstown area suggests the need of decentralizing the present elementary and high school plants located on one 21-acre site by the erection of an elementary school in a rapidly growing section. The new building and extensive improvements in the old elementary school looking to fire safety, gymnasium, and shop facilities, are well within the economic ability of the community. The survey proper is realistic, conservative, and fully progressive.

A Study of Public-School Building Needs in Lancaster, Ohio

By W. R. Flesher, Eldon B. Sessions, Willis A. Whitehead, Burvil Glenn, and T. C. Holy. Paper, 107 pp. Published by the Bureau of Educational Research, Ohio State University, Columbus, Ohio.

This study of school building needs in Lancaster, Ohio, involves (1) the educational program and organization, (2) the school population, (3) the present school plant, (4) the ability and willingness to support the building program. The recommendations include (1) reorganization of the schools on a 6-3-3 basis, (2) the establishment of kindergartens, (3) the erection of a well-planned junior high school building to relieve the senior high school and various grade buildings, (4) the remodeling of a number of the elementary schools and the addition of a gymnasium-auditorium, (5) the abandonment and sale of one old building, (6) the use of released rooms for additional instructional services, particularly industrial arts, etc. The total estimated cost of $1,500,000 can be financed by a bond issue of $1,300,000 and the use of other available funds. The entire study represents a fine example of both educational and social inquiry, with conservative consideration of the economic willingness of a community to better its schools.

Boiler Heating Guide

By K. C. Richmond. Paper, 30 pp., 10 cents. Published by Coal-Heat Magazine, 20 W. Jackson Blvd., Chicago, Ill.

This wartime booklet, for users of steam or hot water boilers and radiators, tells how to improve heating results, reduce heat losses, save fuel, and cut costs. The booklet discusses choice of fuel, stokers, temperature controls, vents and valves, boiler feeders and low-water cutoffs, cutting of heat losses, heating costs, and firing methods.

Building Heating Guide

By K. C. Richmond. Paper, 47 pp., 10 cents. Published by Coal-Heat Magazine, 20 W. Jackson Blvd., Chicago, Ill.

A booklet prepared especially for janitorial employees, school buildings and owners of large buildings. It is written in simple, nontechnical terms, and tells how to cut heating costs, save fuel, reduce heat losses, and improve heating results. It contains a number of questions for checking the performance of heating systems.

School Expense Compared With Combined City and School Expenses, 1943–44

Paper, 5 pp. Bulletin No. 10, October, 1946. Published by the Research Division of the National Education Association, Washington 6, D. C.

The earlier reports on school expense, covering the years prior to 1941, gave information for those school districts which were independent units of local governments. The present report presents for the years 1943 and 1944 information of city corporations and offers a comparison between expenditures for schools and for total city and school expense in cities over 100,000 population. The information pertains to 43 cities where the schools are a part of the local city governments, and includes total city and school expense, school expense only, costs per capita, and per cent that school expense is of total city expense.

History of Legislative and Administrative Changes Affecting the Philadelphia Public Schools, 1869–1921

By Charles R. Nash. Paper, ix–169 pp. Published by Temple University, Philadelphia, Pa.

This doctoral dissertation, accepted in 1943 and just published, is valuable for an understanding of the development and present status of city school administration in our large cities, particularly as it relates to the growth and changes in function of the board of education and of the superintendent of schools.

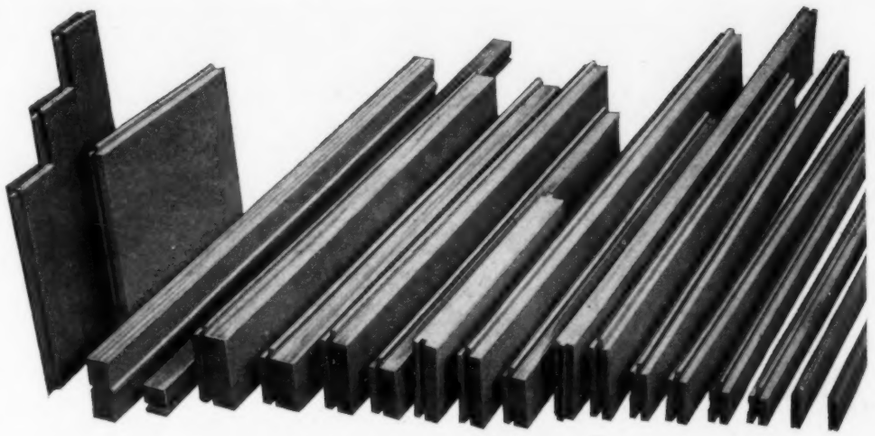
Philadelphia was cursed in some decades with men who made use of the schools for the worst type of political purposes. It was blessed by men and women who had the finest idealism for upbuilding a school system that should help develop individual citizens and the community. Philadelphia pioneered in obtaining the services of great superintendents — Alexander D. Bache, James MacAlister, Edward Brooks, Martin G. Brumbaugh, and Edwin C. Broome, not to forget the present incumbent, A. C. Stoddard. On the side of lay leadership there was a succession of able men and women who were locally very influential but whose names never received national acclaim, except perhaps Dora Keen and Simon Gratz, who were responsible for extensive fights against political corruption and led in legal and organizational reforms.

The Philadelphia public schools as such were first developed from the religious schools as charity schools and were held in low esteem as such. About 1830 the growth of the community as well as other circumstances caused a reorganization for the education of all the children who might want to attend. Each ward had its school and its own school board. Periods of efficiency were followed by decades of overcrowded and insanitary buildings, by political control of teachers appointments, by wasteful management, and by poor organization and teaching. At one time 39 separate school boards had the political control of the schools in as many wards, and the central board of public education was practically without authority.

In 1871, following the Centennial Exposition, Superintendent James MacAlister was brought to the city and succeeded in greatly raising the school efficiency. Between 1888 and 1905 there was a serious decline in school efficiency caused by the increase in the political activity of the local boards. It was a period when Philadelphia was referred to as "corrupt and contented."

Following a fight for school reform which extended throughout the state of Pennsylvania, a fundamental codification of the school laws caused the elimination of the ward school boards, the centralization of authority in the city-wide board, and the elevation of the superintendent to a position of considerable authority as chief executive. To effectively remove the board from political influence the appointing power was placed in the hands of the local judiciary, a plan which has brought to the board of education a high type of citizen, interested in education, and free from the usual cheap, harmful influences. Since that time Philadelphia schools have been generously financed, housed in fine buildings, and staffed with professionally competent supervisory officers and teachers. The high schools especially have flourished. From the time of Martin G. Brumbaugh, who came in on the tide of the 1905 reform, to the present incumbent, the superintendents have been men of national reputation.

The book contributes usefully to an understanding of the problems and difficulties through which city school systems have come to perfect their administrative setups.



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School Board Conventions

STATE SCHOOL BOARD ASSOCIATION CONVENTIONS

January 9. *Tennessee Association of Public School Board Members,* Hermitage Hotel, Nashville. Mrs. Delbert Mann, secretary-treasurer, Nashville.

January 13–14. *Nebraska State School Boards Association,* Lincoln. Alice A. Greenslit, secretary-treasurer, Stanton.

January 22–24. *Minnesota School Board Association,* St. Paul. Otto W. Barbo, secretary-treasurer, Braham.

February. *Idaho School Trustees Association,* Boise. J. C. Eddy, secretary-treasurer, Boise.

February 6–7. *Pennsylvania State School Directors Association,* Harrisburg. P. O. Van Ness, executive secretary-treasurer, Harrisburg.

NEW HAMPSHIRE SCHOOL BOARDS MEET

The New Hampshire school boards have organized a state association. The first meeting was held in Concord on November 25, with an attendance of 77 school board members from all parts of the state.

The Association has authorized the preparation of a school board manual of accepted practices for the guidance of local school districts.

At the meeting, Franklin Hollis, of Concord, was elected president. Other officers are James F. Malley, Somersworth, first vice-president; Wilbur C. Goodson, Tamworth, second vice-president; Paul E. Farnum, secretary-treasurer; an executive council was appointed, consisting of Elmer H. Southard, Paul J. Fenton, Ross Knight, J. F. Malley, Mrs. Hilda M. Howard, P. Carver, Mrs. Elizabeth Bascom, Mrs. Ruth S. Kirk, William B. Eaton, Chester Davis, and Ernest H. Nedeau.

TEXAS ASSOCIATION OF SCHOOL TRUSTEES MEETS

The Texas Association of School Trustees held its first postwar conference in Houston the last week in November at the same time the Texas Teachers' Association held their first annual convention.

The purposes of this organization, as set out in their constitution, are (1) to promote a better understanding of the duties of trustees, (2) to accord proper recognition to capable superintendents and other administrative officers, (3) to be able to better answer to the people by whom they are elected. At their meetings they are to exchange ideas concerning their duties and their relation to others; to clarify the duties between the school board and those of the administrative officers; and to exchange ideas and study plans for the encouragement of local interest in better schools.

They also strive to lead in a liberal program of financial support for the schools, and to secure the co-operation of the parent-teacher association, and other similar organizations, in bringing the needs of the public schools to the attention of members of the legislature in their own counties or districts. They co-operate with the State Teachers' Association, and the State Department of Education, in their efforts to improve the public schools, and endeavor to keep the public informed as to the needs of the public schools.

Dr. Henry Peterson, president of the board of education of the Houston Independent School District, gave the welcome address at the opening of the conference, and the visitors were entertained at a luncheon on the opening day in the board's dining room as guests of the local members. H. B. Allman, of Indiana University, spoke on "The Value of Board Associations," bringing out the strength gained by co-ordinating with similar groups in different states.

Dr. Ray K. Daily, president of the state organization, gave a brief outline of school board associations in the United States. She also stressed the strength gained by working with, or co-ordinating with, similar organizations throughout the nation where there are public schools. Mrs. B. F. Coop, secretary of the organization gave the home organization sketch in a brief history of its accomplishments. The bright as well as the dark side of the financial problems which have and are now facing the schools were given by H. L. Mills, business manager of the Houston district. He particularly stressed the need of more funds for buildings and equipment, as well as better salaries for teachers.

A general discussion followed each talk and it was voted to take under advisement uniting with the other 33 states in the union which forms the National School Board Association.

Dr. Dailey and Mrs. Coop were re-elected to their former offices, with Dr. David Carter, Jr., of Dallas as vice-president.

Earl H. Beling

Member, Board of Education, Moline; President, Illinois School Boards Association 1946–47.

Personal News

► The school board at Latham, Ill., has reorganized with Loy James as president. The new members of the board are Ernest Campbell, Floyd Buckley, Merlin Centers, Verne Garrison, Albert Grathwohl, and Orval Taylor.

► James A. Dick, Jr., has been appointed a member of the school board at El Paso, Tex.

► F. Dean Bechtol has been elected president of the school board at Garrett, Ind.

► James E. Reynolds has been elected president of the school board at North Kingston, R. I.

► Earle B. Dane has been elected president of the school board at East Greenwich, R. I. Mrs. Ruth W. Brown was re-elected as clerk.

► Justin M. Smith has been elected president of the school board at Putnam, Conn.

► The board of education of Middletown, Pa., has reorganized with the election of Beane D. Klahr as president, and H. B. Garver as vice-president.

► The school board at Hazleton, Pa., has re-organized with George Yeager as president, and William Steele as vice-president. After the board meeting, a banquet for the board members and employees was tendered by Supt. Thomas L. Hinkle.

► A. K. Nushan has been re-elected to another four-year term as supply commissioner for the board of education in St. Louis, Mo. The re-election of Mr. Nushan to the position was unanimous.

► Dr. Homer Price Rainey, formerly president of the University of Texas and Bucknell University, has been elected president of Stephens College, where he succeeds Dr. James M. Woods.

► Frederick Crosby Hodgdon, a former member of the firm of Ginn & Company, died at his home in New York City on November 17, at the age of 73. A graduate of Tufts College in 1894, he joined Ginn & Company in 1896, and was made a partner in the firm in 1912. He retired in 1931.

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Teachers' Salaries

FORT MADISON SALARY ADJUSTMENTS

The board of education of Fort Madison, Iowa, upon the recommendation of Supt. H. L. R. Paschal, has put into effect the following salary adjustment:

Teachers receiving pay between $1,400 and $1,650 were given increases of $250; those between $1,650 and $1,900, increases of $225; $1,900 and upward, increases of $200; men teachers were given increases of $300. Janitors received increases of $100, and lady janitresses, increases of $75. Secretaries were given increases of $100.

The adjustments which went into effect on January 1 are intended to assist teachers in meeting the new high cost of living.

PHILADELPHIA INCREASES SALARY RATES

Salary increases, ranging from $275 to $700 for teachers and administrative personnel have been included in the 1947 budget of the Philadelphia board of education. The $38,000,000 budget includes $2,150,000 in salary raises for the school district's 7000 teachers and $350,000 for 3000 business and custodial employees.

The budget is based on a tax rate of $1.17½ for each $100 of assessed real estate value, which is unchanged this year, plus a $5,555,000 state appropriation.

The raises for teachers, representing an advance of two increments on the salary schedule, have been granted without any contract stipulation that they be continued in force after 1947. The amounts of increases over 1946 and the new maximums to be given to 80 per cent of the teaching staff in 1947 are: teachers — senior high, increased $275 to $3,900; junior high, $300, to $3,525; elementary, $350, to $3,225; principals — elementary, increased $400 to $4,900; high school, increased $400 to $6,400; supervisors — $400 increase to $4,600; special assistants — $400 to $5,400; assistant directors — $500 to $6,000; directors and district superintendents — $700 to $7,500; associate superintendents — $700 to $9,000.

The total salary costs represent $25,320,000 of the budget. The remaining items are: administration, $1,156,892; co-ordinate activities and agencies, $1,360,279; operation of plant, $4,053,816; maintenance, $1,193,000; fixed charges, $870,233; warehouse stock, $500,000; debt service, $3,665,805.

The budget shows no outstanding change from 1946 in any item except that of salaries. Walter Biddle Saul, finance chairman, has declared that the higher salary commitments mean a potential deficit of $1,300,000 by the end of the fiscal year, particularly, if tax receipts drop below the budget estimate of $31,530,000. The board anticipates an allotment of additional revenue at the hands of the 1947 state legislature.

NEW SCHEDULE FOR PAYMENT OF EXTRACURRICULAR SERVICES

The board of education at Middletown, Pa., at a meeting on November 4, approved a program for reimbursement for services rendered by teachers in extracurricular assignments and inclusive duties.

Payments of amounts for services rendered are due and payable at the close of each event. Those paid by the high school will receive reimbursement from the high school treasurer; all others will be paid by the board at the next regular meeting following the close of the event. The schedule, as approved, is as follows:

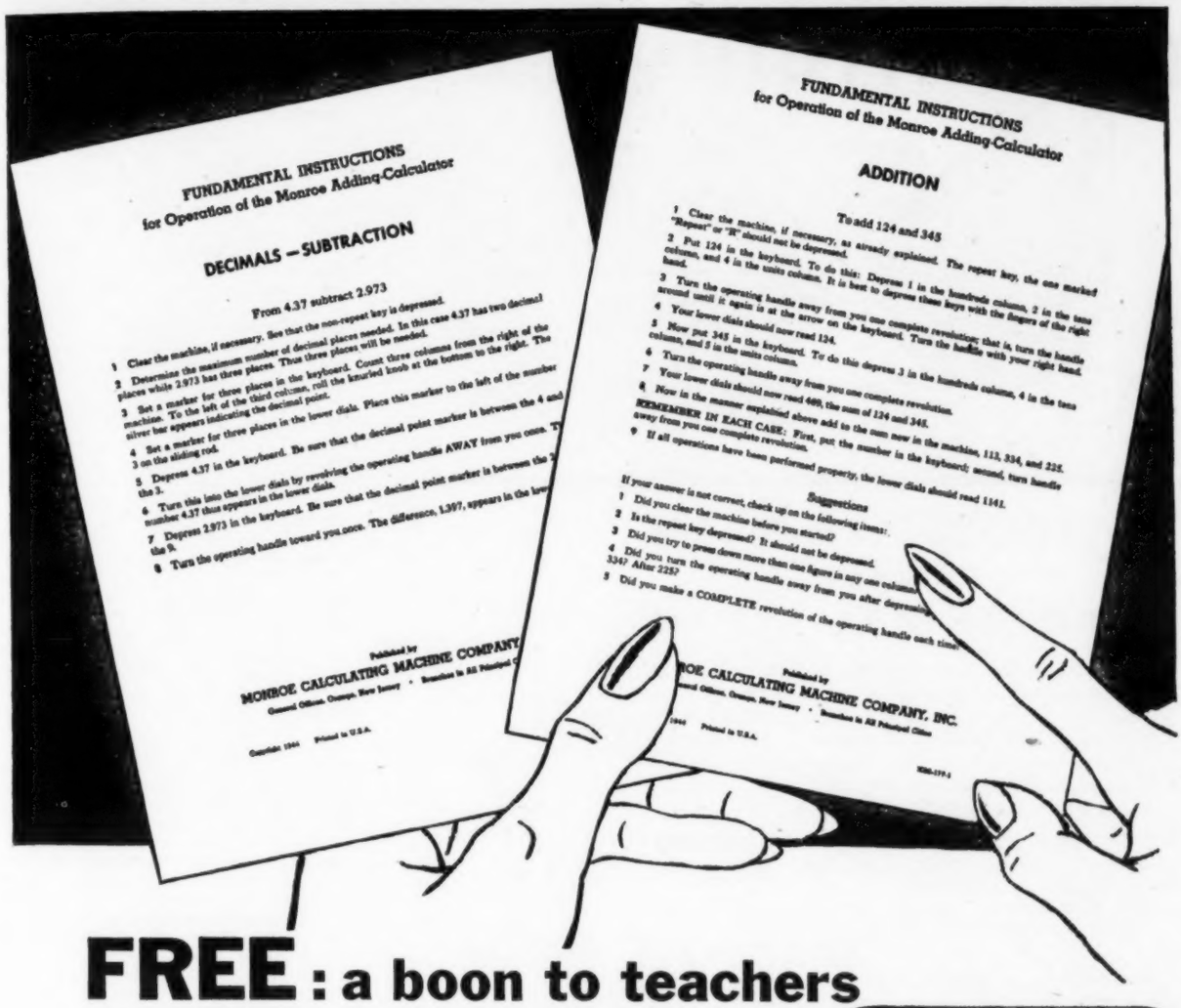
1. *Faculty Manager of Athletics* (paid by high school), 10 units. Arrange schedule, secure officials, arrange for conduct of contests, represent school at meetings.
2. *Financial Treasurer* (paid by high school), 10 units. Receive all monies of school activities, pay all bills, arrange for sale of tickets, prepare financial statements.
3. *Director of Dramatics* (paid by school board), 6 units. Arrange for presentation of one-act plays, direct the senior play, supervise commencement program, including dramatics, advise on assembly numbers.
4. *Class Advisers* (six) (paid by school board), 4 units. Direct the organization and conduct of class affairs, plan the raising of monies for special funds and class activities, chaperon class dances and parties.
5. *Debate Coaches* (two) (paid by school board), 2 units. Select team, arrange schedules, prepare teams, arrange for transportation.
6. *Assembly Adviser* (paid by high school), 2 units. Plan and supervise assembly programs.
7. *Group Leaders* (5) (paid by school board), 2 units. Student council, tri-Hi-Y, dance orchestra, marching club, ushers.
8. *Athletic Coaches* (paid by high school), 10 units, football; 10 units, basketball; 4 units, baseball; 3 units, track.
9. *Assistant Coaches* (2) (paid by high school), 8 units, football; 5 units, basketball; 3 units, baseball; 1 unit, track.
10. *Director of Publications and Duplicating Work* (paid by high school), 10 units. Plan and supervise publication of school paper, plan and supervise yearbook, supervise all special ditto, mimeograph, and typing work.
11. One-act Plays (three) (paid by school board), 2 units. Coaching, selecting staff, presenting one-act plays, handling and assemblying of properties and lights.

Each unit represents 25 hours of work spent outside of school hours or equivalent responsibility. A unit represents $10 additional salary per year.

► Ames, Iowa. All full-time school employees have been given monthly increases of $17.50 in the cost-of-living bonuses for the balance of the school year. Full-time teachers, clerks, and custodians share alike in the new pay scale, and part-time employees will receive proportional increases.

► Denison, Iowa. Cost-of-living bonuses of $120 have been given to 43 teachers and school employees for the balance of the school year. The bonuses will be paid at the rate of $20 per month for the next six months.

► Pleasant Valley, Iowa. Five striking teachers have returned to work with their pay increased to $180 per month for the next six months.



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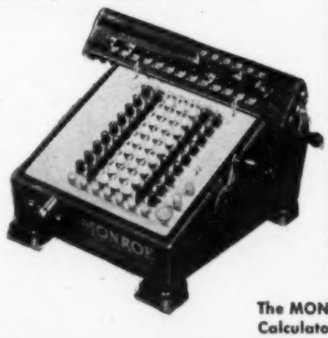

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TEACHERS' SALARIES

► Midland, Mich. All teachers and school employees have been given bonuses amounting to $7,500. The instructional staff received bonuses of $50 each, and cafeteria, secretarial, and maintenance workers $25 each.

► Taylorville, Ill. The school board has given cost-of-living bonuses of $100 to the school employees. The bonus is being paid in two installments, one of $50 at the midyear, and another of $50 at the end of the school year in June.

► Macomb, Ill. Members of the instructional staff and school janitors have been given cost-of-living bonuses of $100 each. The bonuses will be paid at the rate of $10 per month for the next five months.

► Whitewater, Wis. All teachers, janitors, the superintendent, and the superintendent's secretary have been given cost-of-living bonuses of $25 per month for the balance of the school year.

► Hinsdale, Ill. The school board has approved 15 per cent cost-of-living increases for all teachers and school employees, to be effective for the balance of the school year.

► Peru, Ill. The LaSalle-Peru township high school board has voted to raise each level in the salary schedule by $100 per annum, retroactive to the beginning of the school year. The beginning salary will be $1,700.

► Haverhill, Mass. The school board has approved temporary salary adjustments of $300 for full-time school employees, including teachers, substitutes, clerks, and janitors, together with temporary 15 per cent increases for part-time employees. The adjustments became effective January 1, 1947.

► New Orleans, La. Teachers of Orleans Parish have been given average, over-all salary increases of 12 per cent, or $370, for the school year 1946–47. The increases, made possible through additional state appropriations, affect 1232 white and 536 Negro teachers.

► Englewood, Colo. All teachers have been given increases of $200 a year, beginning with January 1. Teachers holding A.B. degrees will be raised to $2,300 per year.

► Brodhead, Wis. The school board has approved a request of the high school teachers' committee, providing for $150 increases for high school teachers receiving salaries of less than $1,199, and $125 for those who receive salaries of $2,000 or over.

► Canton, Ill. The school board has given all teachers 8 per cent salary increases.

► Galesburg, Ill. The school board has approved annual salary increases of $300 for 193 teachers whose salaries averaged $2,080. The payment of the salaries is dependent upon a revised budget and appropriation ordinance.

► Monroe, Wis. Teachers in the city schools have been given cost-of-living bonuses of $250 each, plus $25 for dependents. The increases are dependent upon means for financing the payments.

► Princeton, Ill. The school board has given 10 per cent salary increases to high school teachers, janitors, and office clerks. The present increases will amount to $265 per year, and will raise the average salary in the high school from $2,665 to about $3,000.

► Shamokin, Pa. The school board has adopted a new schedule, making the starting salary for all teachers $1,800 per year. The maximum for teachers with a bachelor's degree is $2,700, and for those with a master's degree $2,900. All reappointed teachers have been given increases of $300 over last year, retroactive to September, 1946. Heads of departments will receive $100 additional salary.

► Holyoke, Mass. The school board has appointed Henry M. Padden, a principal, as chairman of the teachers' evaluation committee. The committee will study the plan for a single-salary schedule and will evaluate and approve courses which the teachers will take for professional improvement to qualify for salary increases under the schedule.

► West Allis, Wis. The school board has approved a suggestion of its special committee, that all professional employees be given increases of $30 per month.

► A total of 1150 teachers, principals, and supervisors in the public schools of St. Paul, Minn., walked out of their classrooms on November 25, following a strike notice. The strike began following a report to the city council that the city was unable to grant any part of demands for a $50-a-month increase in salary.

► More funds for salaries of teachers in the Cleveland, Ohio, schools have been assured as a result of overwhelming acceptance by the city's voters, at the November election, of a 1.5-mill current expense levy of the Cleveland board of education. Members of the board had promised that if the tax were passed the funds would be used for teachers' salaries and for maintenance costs.

Mrs. Norma F. Wulff, president of the board, had warned that unless the levy was approved the system would not be able to furnish a full year's schooling for the city's 102,000 pupils in 1947. She had said defeat for the tax would mean curtailment of certain vital services—kindergartens, playgrounds, and special activities. In Cleveland's suburban communities 19 school levies and six school bond issues were approved by the voters.

► Clayton, Mo. The board of education has voted to increase the salaries of all school employees $20 per month, beginning with December 1, 1946. The increases are in addition to the regular salary increments and an increase in the cost-of-living adjustment provided at the beginning of the year 1946. Under the new program teachers' salaries are now $650 above the basic salary schedule. All members of the school staff are members of the Missouri Teachers' Association and the National Education Association. The record for consecutive 100 per cent membership now covers 23 years.

School Building News

BENEFITS FROM PROPERLY PAINTED CLASSROOMS

School officials and school building superintendents will be interested in a school painting project, carried out in the classrooms at Wesleyville, Pa., under the direction of William B. McKee, supervising principal of the Wesleyville schools.

In doing the work, four shades of color were used in each room, with the lightest shade on the ceiling, a slightly darker flat paint on the walls, a medium semigloss on the dado, and a dark matching shade on the woodwork. In the halls, one color scheme was used throughout.

After the completion of the painting, the teachers and pupils reported a number of benefits which they enjoyed as a result of the varied color schemes: (1) They greatly increased the school spirit. (2) Pupils took pride in their school. (3) A greater effort was made to keep the school and the surrounding grounds clean and neat. (4) No writing appeared on the walls. (5) A greater interest was manifested in classwork.

Teachers, pupils, the board, and the local community were much pleased with the appearance of the classrooms after the completion of the job.

SCHOOL BUILDING NEWS

► York, Pa. The voters of the city have approved a school-bond issue in the amount of $1,750,000, the proceeds to be used for improving the school plant. The bond issue is the first step in a long-range building program, which is the result of a survey made by Dr. William E. Arnold and Dr. Theodore L. Reller, of the State University. The program will include two elementary school buildings and a junior high school to replace the Hannah Penn building. The latter will be remodeled to serve as a school administration building.

► The board of education of New York City has announced that it is in position to begin the construction of 61 badly needed schools in 1947 provided the municipal government will provide the necessary money. The amount required for the construction program is approximately $75,000,000. This sum the board has counterposed against the $20,000,000 which the City Planning Commission has recommended for 18 new buildings, two special projects, and a limited modernization program.

As a minimum program for 1947, the school authorities have maintained their demand for adding 11 other new schools and a supply depository to the planning commission's recommendations. The minimum program will reach an estimated cost of $17,500,000.

► Rocky River, Ohio. Preliminary floor plans for Rocky River's proposed new $960,000 high school have been approved by the board of education. Harry A. Fulton, architect, has been instructed to draft final plans, which are to be completed in six to eight months.

The school will be of two-story brick and stone construction, with a moderately modern exterior design. Included will be 13 academic classrooms, 3 commercial rooms, 4 science rooms, an art room, 3 library rooms, a large home-economics room, music practice rooms, a shop section, dramatic and visual education room, a suite of offices, an auditorium with seating capacity for 1050, a cafeteria for 250, and a double gymnasium with partitions and seating capacity for 1400.

► The voters of Holtville, Calif., have recently approved a $260,000 school-bond issue for an administration and classroom building.

► Kutztown, Pa. The school board has begun plans for an extension to the present school, work to start as soon as conditions permit. The addition will provide an agriculture department, a commercial department, and a music unit. The new instrumental music program has progressed satisfactorily and a new school band has created much interest. A campaign has been started to raise funds for the purchase of band uniforms.

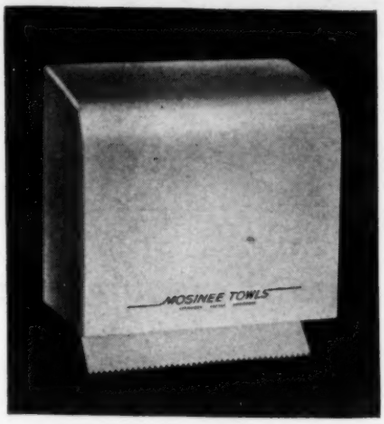
► Cabool, Mo. The school district has been bequeathed $50,000 in a trust fund for building a hall of science. The bequest was contained in the will of Dr. Henry T. Bailey, a former resident.

► St. Louis, Mo. The FWA has approved a loan of $25,000 to the school board to finance the preliminary planning for $1,242,332 worth of new school construction.

► New Castle, Pa. The school board has begun plans for the erection of a large addition to the senior high school to house a cafeteria seating 600, a home-economics suite, and a music room. The cafeteria will be so arranged that it can be converted into three large study halls when not in use for a cafeteria. This will release present study halls which will be divided into regular classrooms. The board has converted an old elementary school into a maintenance building and storeroom. A contract has been let for the construction of steel bleachers on one side of Taggart Field, affording 30 rows, 360 feet long. About 400 seats will be covered.

► The board of education of Middletown, Pa., has completed the development of a new athletic field, to be known as the Middletown Memorial Athletic Field. The total cost of the field, with fence, portable bleachers, a floodlighting system, goal posts, and other incidentals, was $26,153.81. The cost of the floodlighting system alone was $12,604.67.

The Middletown Memorial Association has been given permission to develop a permanent football field at the rear of the present one. Equipment from the present field will be moved to the permanent field next spring and new bleachers will be erected to seat 2000 additional persons.



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Resolved To maintain the high standards of quality established for Mosinee Sulphate Towels which have earned for them nation-wide recognition as the "towel choice" of thousands of those to whom is given the responsibility of purchasing towels for school washrooms.

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MONTANA SCHOOL BOARDS DISCUSS BASIC NEEDS

The Montana School Boards Association held its twenty-first convention in Miles City, December 9 and 10, with a large attendance.

Floyd E. Young, of Helena, delivered the president's address. Secretary J. L. Gleason, of Livingston, presented his annual report which was accepted. The opening session was devoted to discussions on finance.

Art Neill, of Helena, gave a talk on "Financing Montana Education." Speakers at the afternoon program were G. R. Milburn, J. F. Patterson, and C. G. Manning. The annual banquet was held in the evening, with a program of music and entertainment.

Kalispell was selected as the convention city for the 1947 meeting.

The meeting closed with the election of officers. Harry L. Stamp, Miles City, was elected president; B. H. Gullickson was named first vice-president; V. E. Gibson, Great Falls, second vice-president; Jay L. Gibson, Livingston, was re-elected secretary. Margaret Leary was re-elected as a member of the board of directors.

ATHOL SALARY SCHEDULE

Athol, Mass. The school board has approved a new salary schedule, prepared by a committee of classroom teachers representing the high school, the elementary schools, the primary schools, and the local teachers' association. The purpose of the schedule is to establish an equitable adjustment to the present salaries, to recognize training and experience, to encourage teachers to continue their professional studies, and to establish a schedule which will attract the best teachers to the schools.

The schedule is arranged on three levels of training: (*a*) category for teachers without a bachelor's degree; (*b*) category for teachers with a bachelor's degree; (*c*) category for teachers with a master's degree.

Teachers in Category A will begin at a minimum of $1,650 and will advance by annual increments of $100 up to a maximum of $2,650, and by further increments to a supermaximum of $2,750. Teachers in Category B will begin at a minimum of $1,800, and will advance by annual increments up to a maximum of $2,800, and to a supermaximum of $2,950. Teachers in Category C will begin at $2,000, and will advance to a maximum of $3,000.

The annual increments of $100 are payable in September of each year so that any teacher will be able to reach the maximum within a ten-year period. All increments are to be given upon the recommendation of the superintendent and principals.

For purposes of determining the present salary of a teacher, he or she will be placed in the proper category and allowed one increment step each year for teaching in Athol, and one step for each two years outside of Athol. A maximum of five increment steps will be allowed for outside experience.

The board is promoting in-service professional growth of teachers by encouraging each teacher to continue professional study. A special increment of $50 will be given for each six semester hours of training completed. This increment is cumulative but is not permitted to exceed the supermaximum of $2,750 for a nondegree teacher and $2,950 for a teacher holding a bachelor's degree. The supermaximum for study beyond the master's degree will be given at the discretion of the board. It is provided that only courses completed after January 1, 1947, will be counted as credit for these increments.

All teachers are required to take at least two semester hours of training once every five years. Failure of a teacher to comply with the rule means that he or she will lose the increment to which he or she is entitled. Teachers reaching the supermaximum salary must continue their professional studies by taking at least two semester hours once every five years.

SOUTH FORK COMPLETES BUILDING IMPROVEMENTS

The board of education at South Fork, Pa., has completed a number of improvements in its school plant. New cement sidewalks have been laid around the school building; all fire escapes have been repaired; a concrete base tennis court has been built on the athletic field, with a fence 10 feet high. Interior work included a new storage room for football and stage equipment and the repainting of 12 classrooms. The physical education department has received new equipment in the form of different types of athletic apparatus and the addition of two full-time instructors.

A HEALTH AND PHYSICAL EDUCATION PROJECT

The Bureau of Health Education of the American Medical Association has established a health and physical fitness project, which is a step forward in its effort to contribute to the promotion of health.

The project will include the health and fitness problems of the preschool child, the school child, the college student, and adults. The committee believes that it is first in the schools and second in industry that the most immediate and most practical approach to the problem lies.

The committee will not set up any master plans or ideal health programs, but rather will seek to accumulate source files on the varied health programs now in use with the purpose of making reports on these programs to boards of education, to boards of health, and other bodies.

Dr. Dean F. Smiley and Fred V. Hein have been appointed as consultants in health and physical fitness for the Bureau. Mr. Hein, the educational consultant, comes directly from the school field and has taught all phases of health and physical education.

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ASBJ 1-47

THE ST. PAUL SCHOOL STRIKE GOES ON

Union teachers, striking for higher salaries, closed the schools of St. Paul, Minn., on November 25. The strikers, members of the AFL, picketed all of the 77 grade and high schools of the city, and no attempt was made to convene classes. The rank and file did picket duty in relays, in groups of two to four to a school.

The teachers striking mainly for higher pay asked for the immediate payment of a $200 cost-of-living bonus, a new salary schedule, calling for a starting pay of $2,400 annually and a maximum of $5,000 for teachers holding degrees, and an annual increase of $1,700,000 in the school budget to finance cost of maintenance, new equipment, and new construction. The teachers signified that they were willing to go back to work provided the voters approved an amendment in the Charter for a per capita $20 limitation for the schools, in addition to state and federal funds.

The strike has been in progress up to December 20, and at the time of going to press there appears to be no evidence of a solution. The city charter commission, which failed in its first attempt to reach a decision, will make another attempt to reach a solution. In the meantime, 34,000 school children are being kept out of the schools.

MILITARY TRAINING TO BE STUDIED

President Harry Truman, on December 20, announced the appointment of a commission of nine to study universal training of young men and possibly, young women. The commission is headed by Dr. Karl T. Compton, president of the Massachusetts Institute of Technology, and includes Joseph E. Davies, as vice-chairman, and Mrs. Anna Rosenberg, as secretary.

In his statement to the Commission, the president emphasized that "the military phase is incidental to what I have in mind" in connection with a universal training program and that "I want that word 'military' left out."

"I want our young people to be informed on what this government is, what it stands for—its responsibilities," he said. "And I think the best way to do this is through a universal training program.

"I don't like to think of it as a universal military training program. I want it to be a universal training program, giving our young people a background in the disciplinary approach of getting along with one another, informing them of their physical make-up, and what it means to take care of this temple which God gave us.

"If we get that instilled into them, and then instill into them a responsibility which begins in the township, in the city ward, the first thing you know we will have sold our republic to the coming generations as Madison and Hamilton and Jefferson sold it in the first place."

SCHOOL-BUILDING CONSTRUCTION

During the month of November, 1946, Dodge reported school buildings erected in 37 states east of the Rocky Mountains in the number of 172, at a total contract cost of $15,130,000.

SCHOOL-BOND SALES

During the month of November, 1946, sales of permanent school bonds were reported in the amount of $13,749,850. The prices dropped considerably bringing up the average interest rate of twenty bonds to 1.78 per cent.

MR. WOOLDRIDGE RETIRES

C. L. Wooldridge, assistant superintendent of buildings for the board of education at Pittsburgh, Pa., has retired and is taking advantage of the pension provided under the school employees' retirement law of Pennsylvania. He rendered long and useful service as a school business executive for the Pittsburgh school district.

Mr. Wooldridge became superintendent of school buildings in December, 1911, and served until June, 1918, when he obtained a leave of absence to render war service as superintendent of housing for the United States Government. In February, 1919, he resigned as superintendent of buildings. Later he was appointed a member of the board of public education, a position he held until February, 1927.

In 1927, he established an architectural office and accepted work as a school consultant in the building of new schools. The Pittsburgh board again elected him superintendent of buildings in June, 1934. In 1940 he relinquished his office and became assistant to M. M. Steen, who was at that time made superintendent of buildings.

The Pittsburgh board has recognized Mr. Wooldridge's long period of service in an official note, deeply appreciative of his splendid work done for the schools of Pittsburgh.

E. TAYLOR BATTEN JUDGED OUTSTANDING SCHOOL-BOARD MEMBER

E. Taylor Batten, who has been selected as the outstanding school-board member in the state of Virginia, has been presented with a victory bond and plaque at the hands of the Virginia Education Association. The award was offered by the National School Service Institute for the first time last year, and won by R. B. Crawford of Farmville.

The selection was made by a committee, composed of Dr. Dabney S. Lancaster, Farmville; Dr. Raymond Pinchbeck, Richmond; and John Meade, Petersburg. Nominations were presented from VEA presidents and school superintendents in each community, and the 13 districts each chose a nominee from the district boards.

MR. McCAHEY TO RETIRE

James B. McCahey, president of the Chicago board of education, has announced that he will retire in April, at the close of Mayor Kelly's present term.

In a public statement, Mr. McCahey recalled that during his 14 years of service great progress had been made in the financial status of the schools, which during the depression years were unable to meet the salaries of teachers. An extensive school building program was completed, and an extensive system of vocational education was inaugurated.

Mr. McCahey's administration was a stormy one, particularly during the past two years.

THE SAFETY FACTOR IN SCHOOL BUILDING PLANNING

(Concluded from page 58)

and plenty have been met and silently cussed.

Ventilation is often reduced to a point where the system is ineffective and becomes a health menace. Vents all stopped off, "because they reverse at times," but the cause is not traced! Blowers are shut down, "because it costs too much to run them"; air filters are changed too rarely, as they are out of sight and out of mind, or they are removed entirely because — and then we get the flimsiest of excuses. Toilet vents frequently have been found inoperative for reasons not very clear; and when odors become noticeable we substitute one smell for another under the impression that a pungent odor is antiseptic. Shower foot baths are empty because they leak!

Storage spaces become loaded with indiscriminate stores; combustibles such as oils, paints, and even gasoline have been found in such rooms. Rarely are they stored in fire resisting areas. We find baled paper stuffed to the ceiling for, "It will be all cleared out by the end of the term." The older attics are nearly all extreme fire hazards as too often they are crammed full of old desks, paper, old furniture, decorative materials, and what have you. Luckily these spaces are rarely found in the modern school.

Even artificial lighting is subject to heavy deterioration, which in turn affects seeing and eyesight. Fixtures are not cleaned when they should be nor blackened lamps or dead tubes replaced; this in effect may reduce the illumination to a degree not suspected. A 40 to 50 per cent reduction is not uncommon — one thus pays for something not received, and the seeing hazard is increased as well. A definite cleaning schedule is quite important.

The cleaning of the walls and ceilings, aside from the aesthetic, is another item which influences the seeing due to the lowering of the reflection coefficient thus leading to a diminished illumination.

"For goodness' sake," said my superintendent friend, "are you going on forever; is there no end to this safety business? It seems to me when you have talked about fire hazards and things which may induce accidents that these about covered the field. Aren't we dragging in a lot of material which is rather far fetched?" This was his second plaint at this point and he deserved an answer.

"At first blush," I said, "it may appear as if we had been discussing matters which had very little bearing on safety. But if you will go over our talk, you will find nothing which does not touch upon our subject in some manner. I believe you have expressed the common notion of safety when you mentioned fires and accidents. But in the larger sense, and as I expressed at the beginning of our talk, safety encompasses much more than these two. Reducing, for example, hazards to health and seeing, even to the extent of talking about decorations and color and cleanliness, all are certainly factors of our safety subject in the larger sense. Shall we stop at only the obvious and leave the more insidious features out of our discussion? The latter may lead to as undesirable results of the grosser factors. And we have not even touched upon 'outside' safety, those of the grounds, access to them, layouts, surfacing, etc. Where does one leave off and the other begin? So let us take everything into consideration and, 'Better be safe than sorry.' I hope you will think this whole matter over before you commit yourself to one or two aspects only. How about it?"

"I'll admit you have the best of the argument and I suppose I have just been steeped in the common method of taking too much for granted and seeing only the mote in the other fellow's eye. I really have a different slant on the whole subject of safety now and these hours have been well spent" was the reply.

So we parted good friends and we both hope that the new school building will be as safe as a lot of thought brought to bear on the plans and subject can make it. And so endeth this lesson.

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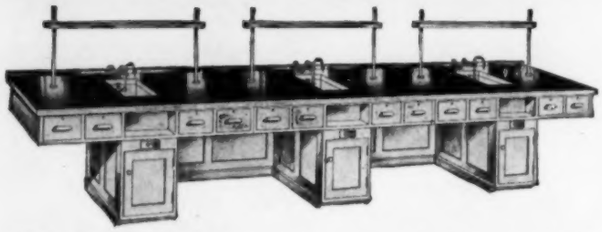

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FINANCING YOUR NEW SCHOOL BUILDINGS

(Concluded from page 24)

Has the board planned the coupon rate the bonds will bear in relationship to the going price for money, and what such price means in terms of income yield?

Does the board know that the difference between such yield and the coupon rate of its bonds is profit to the bond dealer, generally speaking?

Have computations been made to determine what this presumptive profit will be in this particular case?

If it exceeds 1 per cent will the board reject the bids and change its borrowing plans?

Sometimes the school board "overstays" the market for selling, and the borrowing becomes expensive. Does the board have good advice on this score?

When the board has prepared bonds but not sold them for a long period, would it be better to cancel the old borrowing plans and issue entirely new bonds?

Does the board have access to important financial journals, such as the *Bond Buyer*, the *Wall Street Journal*, the *Commercial and Financial Chronicle*, and others with which to keep informed?

Does it have access to a table of bond values in order to calculate the income on investments?

Does the board's practice of employing legal counsel double the costs for such services?

Does the board's regularly retained attorney exact any fee for recommending other legal specialists whose legal opinions are acceptable to investors?

Does any outsider try to "horn in" and make recommendations for a fee?

Does the board know that the cost for acceptable attorney's direction and opinions is about one dollar per thousand dollars of securities to be issued?

Does the board have a full membership according to the latest state laws?

If not, does the board know what its own quorum should be in order to transact business?

Has the board meeting at which the borrowing was authorized been properly called?

Is there proof of the call in the board's minutes?

Have the votes been taken on an "aye" and "nay" basis?

Have the board's minutes completely reflected the board action?

Have the minutes been subsequently approved in regular board meeting?

Have the board minutes been formally signed by the president and secretary of the board?

Does the township school treasurer or other official regularly approve the minutes.

Have all precautions been taken in respect to obtaining proper petitions in respect to locating sites for buildings?

Board Resolutions

Have proper resolutions been drafted and adopted by the school board for each of the several steps preliminary to borrowing money?

Have these resolutions been recorded in full in the board minutes and filed with the proper officials?

Were such resolutions drafted and approved by attorneys whose legal opinions are recognized and accepted by banks, bond dealers, and important investors?

If proceedings in respect to petitions and resolutions have been drafted by other than well-known municipal attorneys, have they subsequently been approved by them?

Elections for Bonding

Have all details of elections involved in school finance been conducted under the guidance of competent legal counsel?

Have the ballots been approved?

In elections to establish school sites have the ballots included adequate description of property to be acquired, and also space in which voters may vote for other sites?

Do samples of the ballots appear in the school board minutes?

Have public notices in respect to elections been properly posted and advertised?

Has proof of such notices been properly recorded in the school minutes?

Has there been reasonable information to the public in respect to the whole project?

Does the school board regularly follow the law as to annual reports in the local press or in pamphlet form?

Do such reports fully describe the projects in which special financing is involved?

Technical Details

Has the board drafted a detailed budget including the spending of the borrowed money?

Has the board had a lawful budget hearing?

Has the board prepared a lawful appropriation ordinance including items involved in the borrowing of money?

Will the school board or the bond dealers pay for approving legal opinions?

Who will pay for printing the securities, the school board or the dealers?

Has accrued interest been added to the purchase price of the securities?

Have the securities been properly signed by school officials?

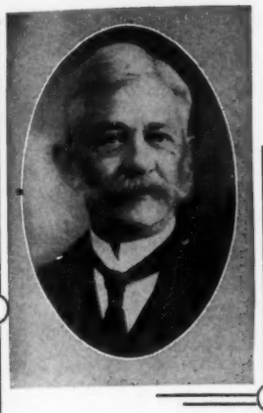
Have the certificates been adequately checked against error?

Have the proper resolutions been filed with the county officials?

Have the bonds been certified by the county clerk?

Have all securities been properly recorded in the district books?

Does the school board have a check on the acts of the school treasurer in order to know that callable securities have been called in for payment promptly to avoid waste in interest charges?



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UNIT VENTILATION

(Concluded from page 31)

exploded in time, leaving no sound basis for the carbon-dioxide theory. Nevertheless, it had laid the foundation for a highly developed art supported by laws and regulations, and the notion that air was somehow vitiated through respiration had become so ingrained that the art carried on of its own momentum.

In the meantime the thermal theory of ventilation was being developed. It had been advanced by a German scientist as early as 1883. But little attention was paid it until, after exhaustive experiments, it was promulgated by the Institute of Hygiene at Breslau in 1905. Even then, it received little consideration on this side of the Atlantic until the problem of ventilation was intensively investigated by the New York State Commission of Ventilation.

The Commission's report, published in 1923, which flatly condemned the carbon-dioxide theory and endorsed the thermal theory, was given wide publicity and received the support of the medical profession. It did not receive the support of the engineering fraternity, largely because it condemned current practice and advocated so-called "open-window ventilation."

If the Commission did not actually err, in this respect, it at least showed poor judgment. The make-up of the Commission was such that it was no more qualified to pass judgment on the practical art, than the engineers were to pass judgment on the theory of ventilation. As a matter of fact, the engineers did not seriously contest the Commission's findings as to the theories involved. There is no doubt but what the "split system" was a complete failure under the thermal theory. But the 30 C.F.M. standard, which was so bitterly assailed by the Commission, though unquestionably wasteful, could at least be rationalized under the thermal theory, whereas, open window ventilation could not.

Time proved that mechanical ventilation could be adapted to carry out the thermal theory with less waste and in a much more satisfactory manner than could open window ventilation. This is accomplished in the modern unit system of ventilation, wherein only sufficient outdoor air is introduced to hold the room temperature at the proper level and to prevent excessive humidity and odor. In the case of school classrooms, it is customary to vary the outdoor air supply, as required, between a minimum of from 7½ to 10 c.f.m. per pupil in cold weather, to a maximum of 30 c.f.m. in mild weather. The accommodating change is made automatically through thermostatic regulation.

The modern unit system meets every theoretical and practical requirement of heating and ventilating schoolrooms at a minimum expense.

PARMA SCHOOL EMPLOYEES RECEIVE PAY INCREASES

The Parma board of education at Parma, Ohio, has approved substantial pay increases for teachers and other school employees beginning immediately. All members of the administrative and teaching staffs will receive a $200 cost-of-living increase, of which $80 will be paid during the midyear, and the balance in six equal installments throughout the remainder of the school year.

Custodians and bus drivers will receive $200 increases on a 12-month basis. One third of this will be be paid at the midyear, and the balance in eight installments. Building secretaries will receive $10 more monthly, and cafeteria and cleaning women will be paid increases of five cents per hour.

The present salary adjustment brings Parma high up among the cities of Ohio. The average salary for teachers and supervisors now is $2,419, with a minimum of $1,700; a maximum of $2,700 is paid to teachers with an A.B. or a B.S. degree, and $3,000 to those with a master's degree. All teachers are on a single-salary schedule and receive the same pay for equal qualifications.

A cumulative sick-leave adjustment has been provided this year, which allows teachers five days sick leave annually, and which may be allowed to accumulate to 30 working days.

DEATH OF GEORGE C. FLOYD

George C. Floyd, veteran Arkansas educator and a member of the Arkansas State Board of Education, died on November 28, in St. Vincent's Hospital, after a brief illness.

Mr. Floyd had been a member of the state department for 25 years, had acted as consultant on school laws and finances during the past few years.

A native of Howard County, Mr. Floyd began his career in education in Pike County after graduation from the Arkansas State Teachers College. He taught for a while in Pike and Clark counties, and then became superintendent of schools in Pike County. Later he became assistant superintendent in the state department. He attended the University of Arkansas and George Peabody College for advanced professional study.

New Supplies and Equipment

CRAYON ART CONTEST

An opportunity in art for every school child is presented in a new art contest sponsored by the Milton Bradley Co., a firm long interested in the field of elementary education. This firm, makers of the Tru-Tone "No-Roll" crayon, through nationwide competition open to children from kindergarten through the eighth grade, hopes to unearth budding artists.

The contest will be broken into nine distinct divisions. One division will cover entries from those of kindergarten age. The eight remaining divisions will cover the first eight grades. The national winner in each of the divisions will receive a $500 war bond, and his efforts will be hung in a Hall of Fame for young artists at the Springfield, Mass., offices of the company.

Milton Bradley Co., Springfield, Mass.

For brief reference use ASBJ—101.

AUDIO-VISUAL TEACHING AIDS

The new Audio-Visual Teach-O-Filmstrips present carefully organized pictorial studies along planned continuities for use in elementary, junior and senior high schools.

The series of film strips covers language, arts, health, science, and social studies. Each is a self-contained teaching unit with motivation, concept teaching, problems and questions for discussion, review, and suggested follow-up activities. Each contains original illustrations, which, when combined with words, provide direct word-picture association. Each is accompanied by a functional teaching guide which includes a part of the Teach-O-Filmstrip. Colorful descriptive folders available on request.

Audio-Visual Division, Popular Science Publishing Co., Inc., 353 Fourth Avenue, New York 10, N. Y.

For brief reference use ASBJ—102.

TRANSPARENT MIRRORS UNDERWAY

The world's first quantity production of transparent mirrors has been announced by Libbey-Owens-Ford Glass Co., Toledo, Ohio, which foresees an extensive use of the product in educational institutions, homes, and commercial houses. The mirror functions as a reflective surface when seen from one side and simultaneously as a window when viewed from the other.

The development constitutes the first peacetime application of what was a highly secret wartime advance in the techniques of mirror manufacture. The process was first successfully removed from the laboratory stage by technicians of the company's Liberty Mirror Division at Brekenridge, Pa., shortly after Pearl Harbor.

Key to the transparent mirror's performance is the almost incredible thinness of the film of chromium alloy with which it is mirrored. While constituting an effective reflecting surface it also permits the passage of light. The film is four ten-millionths of one inch thick.

Libbey-Owens-Ford Glass Co., Toledo, Ohio.

For brief reference use ASBJ—103.

NEW LINE OF FILING CABINETS

A new line of filing cabinets which unites a number of popular and original features is being marketed for the first time by the Lyon Metal Products Co., Aurora, Ill.

The firm's filing cabinets are available in 11 models, with or without general locks, in suspension and nonsuspension types. Five of the models are illustrated.

These well designed cabinets have a number of marked characteristics: (1) rounded corners on drawers and crossrails, solid bronze handles and label holders; (2) easy-rolling drawers slide on six ball bearings and two floating rollers for perfect "flip-of-the-finger" operation; (3) double stops — one set in drawer and one set in carrier — prevent the drawers from being pulled out and dropped; (4) drawers stay closed due to ⅛-in. pitch to the rear; no rebound when drawers are closed hard; (5) drawers may be removed easily — just open wide and lift; no catches or stops to unlatch; back of the drawer has hand grip; (6) round corners on the drawer fronts prevent danger of injury.

New Lyon Filing Cabinets.

Two-, three-, and four-drawer files are available in the legal size; two- and four-drawer files in the nonsuspension type, both letter and legal sizes.

Lyon Metal Products, Inc., 413 Clark St., Aurora, Ill.

For brief reference use ASBJ—104.

WESTINGHOUSE ANNOUNCES TEACHING AIDS

For distribution to high school teachers, the School Service Department of the Westinghouse Electric Corporation has announced a 14-page booklet, describing free and inexpensive teaching aids. Designed primarily for grades 7 through 12, the new materials listed include booklets, charts, motion pictures, and slide films for a variety of classes. Some booklets may be obtained in quantities for distribution to students. Teachers will be interested in others as desk copies. A copy of the *Teaching Aids Booklet* may be obtained through the School Service Department.

Westinghouse Electric Corporation, 306 Fourth Ave., Box 1017, Pittsburgh 30, Pa.

For brief reference use ASBJ—105.

CLASSROOM ABSENTEEISM CUT BY ULTRAVIOLET

Summary results of three years' experience of a continuing study of the effectiveness of ultraviolet lamps in reducing the absenteeism rate of pupils show a decline of as much as 50 per cent.

The pupils of the second-grade room in the Elm Street School, Plattsburgh, N. Y., which was left unguarded by ultraviolet radiation, lost three times as many days of schoolwork, because of respiratory illnesses during the 1944–45 school year, as did the pupils of the adjoining third-grade room which was irradiated with sterilamps.

In the Clearwater, Calif., school district, on the basis of one year's operation of the lamps in one room in two schools, school officials reported no case of contagious disease.

In the Child Health Research Center in Washington, D. C., a nursery school, the rate of absenteeism due to respiratory illnesses was cut in half during the first four months of 1946, as compared with 1945.

Although more data is needed, the evidence points to a good possibility that ultraviolet ray treatment of indoor air can reduce the incidence of "pass on" respiratory disease.

Westinghouse Electric Corporation, 306 Fourth Ave., Pittsburgh 30, Pa.

For brief reference use ASBJ—106.

NEW TENNANT MODEL S EDGING MACHINE

An illustrated bulletin describing the Tennant Model S edging machine has been released by the G. H. Tennant Co., of Minneapolis, Minn. The Model S has two separate motors for dustless operation. One powerful motor drives the sanding disk and a second drives the vacuum system at full speed constantly, picking up all the dust regardless of the load on the sanding motor. The Model S machine uses 7-in. sandpaper disks and is equipped with a headlight.

The Model S is an excellent unit for schools since its small size permits its use in hard-to-reach areas. The machine refinishes desk tops, sands around furniture, renovates thresholds, and refinishes closet floors. It has a leveling-screw adjustment and easy sandpaper changing with disk lock and bar wrench. The frame is constructed of aluminum alloy and the machine operates on d.c. or a.c. current up to 60 cycles. Copies of the bulletin are available.

G. H. Tennant Co., 2530 North Second St., Minneapolis, Minn.

For brief reference use ASBJ—107.

ISSUE MANUAL ON RADIANT PANEL HEATING

The first complete manual on the control of radiant panel heating has just been published by the Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Entitled, "Automatic Control of Radiant Panel Heating," the book is being distributed to universities, school authorities, and architects. The manual offers valuable information, obtained through the assistance of F. W. Hutchinson, whose work with radiant heating problems is well known. Much of the material is drawn from extensive research and test work conducted by the firm over the past several years. The book contains technical diagrams, charts, and photographs, as well as information on the use of graphs for determining the required performance of a heating installation under control. Copies of the book are available.

Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

For brief reference use ASBJ—108.

RADIANT COMPANY OPENS NEW OFFICES

The opening of New York and San Francisco branch offices has just been announced by the Radiant Mfg. Corp., makers of Radiant "Hy-Flect" projection screens. The New York office at 203 East 46th St. will be under the direction of Harry Millar, and the San Francisco office at 821 Market St., of Jack Neuman. These district managers will assist dealers and distributors with valuable selling suggestions and sales aids, for promoting the sale of Radiant products.

Radiant Mfg. Corp., Chicago, Ill.

For brief reference use ASBJ—109.

ANNOUNCE B & L EDUCATIONAL FOCUS, 1946

The Bausch & Lomb Optical Co., Rochester 2, N. Y., has just issued its new *Educational Focus* for the fall of 1946. The firm manufactures fine instruments for efficient, economical, microprojection with standard microscopes. Some of the topics discussed are World's Largest Prism, Rocket Spectrography, Visual Aids in the Zoo, the Human Eye in Anatomical Transparencies.

Bausch & Lomb Optical Co., Rochester 2, N. Y.

For brief reference use ASBJ—110.

A SKETCHING PAD

The Jiffy Sales Company, Cleveland, Ohio, has recently offered for school use a sketching pad, containing tracing tissue sheets, measuring 9 by 12 inches. By a clever arrangement, of cover flaps, sketches may be made on 1/8-inch scale, 1/10-inch scale, and isometric projection.

The Jiffy Sales Co., 1820 East 37th St., Cleveland, Ohio.

For brief reference use ASBJ—111.

DITTO BUYS NEW PLANT

President K. M. Henderson of the Ditto Co., Chicago and New York, has announced the purchase of a new manufacturing plant at 4600 West Parker Ave., Chicago, to be known as Plant No. 5.

The new building program will go forward just as soon as building conditions are favorable. The purchase of the new plant is an interim move to augment the present manufacturing facilities.

JAM HANDY APPOINTMENT

L. G. Stewart has been appointed Pacific Coast regional sales supervisor for the School Films Division of the Jam Handy Organization, according to Frank A. Gauntt, manager of the School Films Division. Many years of experience with the training activities of the Jam Handy Organization make Mr. Stewart well qualified for his new position.

Jam Handy Organization, 2900 E. Grand Blvd., Detroit 11, Mich.

DR. MUNRO EDITORIAL ADVISER

Dr. Thomas Munro, curator of education at the Cleveland Museum of Art and professor of art at Western Reserve University, Cleveland, has been appointed a member of the editorial advisory board of the World Book Encyclopedia. He replaces Dr. George H. Chase of Harvard University, who had served on the World Book Advisory Board since 1936 in the field of humanities and fine arts. Dr. Munro has earned an enviable reputation in educational and art circles throughout the United States as lecturer and professor of philosophy and fine arts, curator, and former editor of the *Journal of Aesthetics and Art Criticism.*

The Quarrie Corporation, 35 E. Wacker Drive, Chicago 1, Ill.

COMING CONVENTIONS

February 6–7. Pennsylvania State School Directors' Association, at Harrisburg. P. C. Van Ness, secretary, 222 Locust St., Harrisburg. Headquarters, Penn-Harris Hotel.

February 13–14. Oklahoma Education Association, at Oklahoma City. Headquarters, Municipal Auditorium. Exhibits, Roxie J. Adams, 306 Key Bldg., Oklahoma City.

February 19–20. American Association of Junior Colleges, at St. Louis, Mo. Headquarters, Hotel Jefferson.

February 27–March 2. Music Teachers National Association, at St. Louis. Wilfred C. Bain, secretary, North Texas State College, Denton, Tex. Headquarters, Hotel Jefferson.

March 1–5. National Association of Secondary School Principals, at Atlantic City, N. J. Paul E. Elicker, secretary, 1201–16th St., N.W., Washington 6, D. C. Headquarters, Haddon Hall Hotel.

March 1–6. American Association of School Administrators, at Atlantic City, N. J. Willard E. Givens, secretary, Washington, D. C.

March 2–4. American Educational Research Association, at Atlantic City, N. J. Frank W. Hubbard, 1201–16th St., N.W., Washington 6, D. C.

March 3–4. National Conference on Research in English, at Atlantic City, N. J. J. C. Seegers, secretary, Temple University, Philadelphia 22, Pa.

March 10. Annual Conference of Child Study Association of America, at New York City. Headquarters, Roosevelt Hotel.

March 13–15. South Carolina Education Association, at Columbia. J. P. Coates, secretary, 1510 Gervais St., Columbia.

March 19–21. Alabama Education Association, at Birmingham, Frank Grove, secretary, 21 Adams St., Montgomery.

March 22–26. Music Educators National Conference, at Seattle, Wash. C. Buttelman, secretary, 64 E. Jackson Blvd., Chicago, Ill.

March 24–29. Northcentral Association of Colleges and Secondary Schools, at Chicago, Ill. G. W. Rosenlof, secretary, 103 Administration Hall, University of Nebraska, Lincoln. Headquarters, Palmer House, Chicago.

March 28–31. Council of Guidance and Personnel Association, at Columbus, Ohio. Helen G. Fisk, secretary, 30 N. Raymond Ave., Pasadena 1, Calif. Headquarters, Deschler-Wallick Hotel.

March 31–April 1. California Association for Health, Physical Education, and Recreation, at Santa Cruz.

Advertisers Products and Services

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